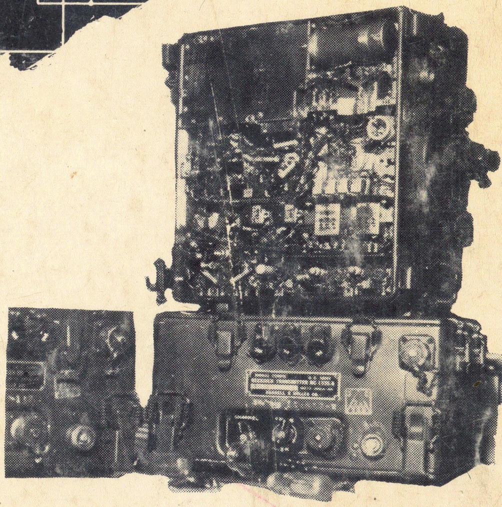
Surplus Schematics Handbook

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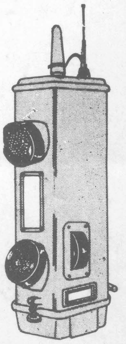
CQ Technical Series

Cowan Publishing Corp.

TELEMARINE—FOR OUTSTANDING ELECTRONIC SURPLUS

BC-611 WALKY-TALKY

COMPLETE WITH CASE



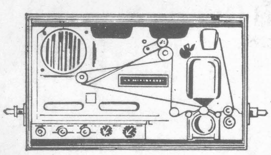
Now, for the first time, Telemarine offers the BC-611 Hand-Held Walky-Talky in complete form. Nothing extra to buy, except batteries which are readily available from most radio distributors. The BC-611 is a crystal-controlled transmitter and receiver covering the frequency range of 3.5 to 6.0 mc. Any good radio technician could easily modify this unit for operation up to 30.0 mc., or for operation in the 2.0-3.0 mc. Marine Band where it can ideally serve as an emergency transceiver (on 2182 KC) on boats too small for regular radiotelephone installation. Excellent for many other emergency applications, because of its compactness (measures 15¾"H. x 3⅝" W. x 5⅜"D.) and light weight, only 5½ lbs., complete with batteries. Supplied Complete with coils (plug-in type, installed), crystals (one for "transmit," one for "receive") for 1 frequency in 3.5 to 6.0 mc. range (no selection of frequency permitted on "Used" sets), tubes, and "A" Battery Adaptor which permits use of 2 conventional #2 Flashlight cells in place of special "A" battery. "B" battery required is special 103 volt long rectangular unit, mfd. by Burgess Battery as "XX-69."

BC-611 WALKY-TALKY, as described, Used-Very Good Condition (not tested), pre-set for 1 frequency within 3.5 to 6.0 mc. (no selection of frequency), less batteries. Shpg. wt. 15 lbs. **EACH $49.50**

BC-611 WALKY-TALKY, COMPLETE, NEW, as described above but NEW, TESTED, and preset to any one desired frequency from 3.5 to 6.0 mc.
EACH $74.50

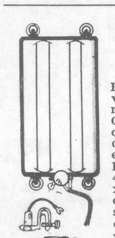
BC-611 WALKY-TALKY CHASSIS, NEW! Excellent, new, Spare Chassis for above, priced so low that in the event of trouble it would be cheaper to insert a new chassis. Also excellent for the Amateur or Technician who prefers to make his own style of Walky-Talky. Supplied less tubes (1—1R5, 1—1S5, 1—1T4, and 2—3S4 tubes required), and less plug-in Osc. and RF Ant. Coils, less crystals. Supplied with Schematic Wiring Diagram). Shp. wt. 8 lbs. **$6.95**
EACH, CHASSIS, as described ....
PAIR OF COILS, for above. RF Ant. & Osc. **$1.25**

TG-34 CODE PRACTICE SET



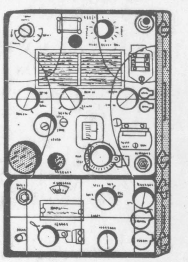
Learn to copy code, or improve your speed with this unit. For individuals, schools, etc. **Complete,** portable automatic unit for reproducing audibly (built-in Loud-speaker) code signals recorded in ink on paper tape. Prerecorded tapes, lessons 1 to 15 (on 15 reels), available from many other surplus houses. Also usable for practicing "sending" by means of internal oscillator keyed by external hand key. Operates from 90 to 120 V. or 190 to 240 Volts, 60 Cycles AC. Units are Used—Very Good condition. Shpg. wt. 54 lbs.
SPECIAL $14.75
TG-34—AS ABOVE, NEW—UNUSED $18.95

ELECTRIC DEFROSTER FOR CAR OR TRUCK



Excellent for passenger cars, commercial vehicles, in stormy weather. Easily removed and stored away when not needed. Operates from electric 6V. DC (use two defrosters—in series—for 12V, DC systems, one can be installed on rear window) and each set is complete with switches, fuse holder, and necessary wire. Defroster has 4 resistance wires running inside glass (8" x 16") to produce heat for defrosting window. Defroster is held to window by 4 suction cups. NEW, UNUSED condition, each packed in metal case. Shpg. wt. 7 lbs. **EACH $7.95**

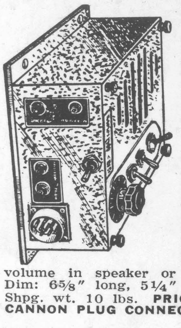
BC-1306 TRANS.-RECEIVER FOR MARS, HAMS, ETC.



For MARS application. 3800 to 6500 KC, MO or Crystal Control. Includes Crystal Calibration and Net Controls. NEW UNITS, with all tubes except Final RF 2E22 tube. Shpg. wt. 50 lbs.
EACH $22.50

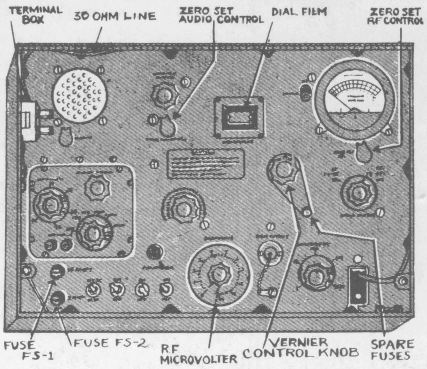
PE-237 POWER SUPPLY
For Above BC-1306. Supplies all necessary voltages and current for both transmitter and receiver sections. Operates from 6, 12, or 24 Volts DC. "LIKE-NEW" units. Shpg. wt. 125 lbs.
EACH $14.95

REMOTE CONTROL FOR MOBILE OR MARINE USE



This is the popular Navy type TCS Remote Control, which includes a heavy-duty loudspeaker. Ideal for mobile (ham, taxi, truck, etc.) or Marine application either as a local or Remote Control Unit. Includes 3 toggle switches, one for turning, "Trans." on or off; one for turning "Rec." on or off; and, one for selection of "speaker" or "Phone" reception. Additional toggle switch permits "Radio" or Intercom usage. 2 pair of Microphone and phone jacks are provided and connections are made through a Cannon receptacle connector (complete Schematic provided). Also provided is a T-pad Volume Control, on front panel, for regulating audio volume in speaker or phones. All units are NEW. Dim: 6⅝" long, 5¼" high, and 3½" deep. Shpg. wt. 10 lbs. **PRICE EACH $6.95**
CANNON PLUG CONNECTOR, to fit above, each .. **$1.65**

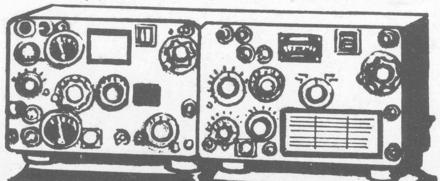
HI-PRECISION FM SIGNAL Generator—Mobile Band



Model I-208, is a precision instrument worthy of the finest lab, mobile service and installation shop, or for production testing of mobile FM equipment. Previously, it was a scarce and expensive instrument, until we made a fortunate "buy" in a limited quantity. Freq. Range in 2 bands, 1.9 to 4.5 mc (for IF alignment and tests) and 19 to 45 mc. Freq. of output of signal is maintained within .03% of dial calibration over a temperature range from 0 to 60 degrees. Other outstanding features are: *Variable Frequency Deviation, 0-5 KC on 1.9 to 4.5 mc band, 0-50 KC each side of resting frequency on 19 to 45 mc band. *Calibrated Microvolter-Attenuator, adjustable up to 100,000 microvolts, developed at the termination of a 30-ohm line. Up to .84 volt available at high output terminals. *RF Vacuum Tube Voltmeter incorporated, 5 modulation frequencies provided by internal audio oscillator, 150, 400, 1,000, 2,500, and 5,000 cps. External modulation also provided for. *Operates from either 110 volts, 60 cycles AC, or 12 volts DC which is ideal for in the field work. *Crystal Calibrator, whose output is 1 mc and harmonics for checking and maintaining accuracy of signal generator. Each I-208 is supplied complete with tubes, calibrator crystal, 12V. DC Dynamotor and 110V. AC power supply are self-contained. Instruction Sheets and Schematic Diagram. Shpg. wt. is 145 lbs. (in wooden case). Available in like new (tested) or Used-Excellent (not tested) condition. Act fast, our limited supply won't last long!

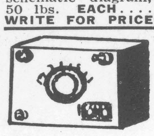
USED. EXCELLENT .... EACH $69.95
LIKE-NEW, TESTED .... EACH $110.00

SENSATIONAL BARGAIN!! TCS TRANSMITTERS, RECEIVERS, AND ACCESSORIES



You've never seen TCS Transmitters and Receivers priced so low! This communications "work horse" of the Navy and Coast Guard never sold in surplus for less than $300. per set (Acq. cost over $4000.00 per set). It's ideal for mobile or fixed station use; precise, trouble-free, and consistent. Excellent for Marine-Band (2-3 mc) applications if certain front panel controls on Transmitter are removed, after pre-setting of frequencies, to meet FCC requirements. It will even meet FCC requirements regarding second harmonic radiation, since the transmitter uses a Buffer stage, plus (variable) link coupling between the final RF Tank and a pi-network which couples to the antenna, all of which reduces harmonic radiation to absolute minimum. Other features of TCS Transmitters and Receivers are: *complete coverage 1.5 to 12.0 mc. all band-switching. *4-channels crystal-control, plus one channel manual tuning (in transmitter precision VFO). *uses 1625 instant heating filament tubes (equivalent to Type 807) in RF Amp and Mod. sections of Transmitter to minimize drain. *Rated at 40 watts CW and 20 watts phone output when transmitter plate voltage is 425 V., but this power can be easily doubled by using 600 volts plate supply. *Transmitter or Receiver designed to operate from either 12, 24, 110 V. DC, or 110/220 V. AC power supplies. Power Supply Diagrams furnished. *Receiver is super-sensitive superhet, with excellent sensitivity & selectivity characteristics, and includes BFO circuit for CW reception. Units priced below are complete with tubes, good clean condition but untested.

TCS-5(to 9) TRANSMITTER, with all tubes, schematic diagram and power supply diagrams, as outlined above. Shpg. wt. 60 lbs.
PRICE EACH $39.95
TCS-9(to 14) TRANSMITTER, same as above but has minor modifications which make these models more desirable. **EACH $59.95**
TCS-5(to 14) RECEIVER, complete with tubes and schematic diagram, as described above. Shpg. wt. 50 lbs. **EACH $69.95**
WRITE FOR PRICES ON OTHER TCS ACCESSORIES.

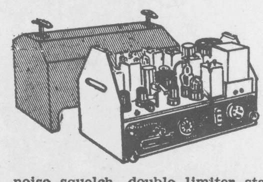


TCS ANTENNA LOADING COIL. Used with above equipment to obtain maximum performance with short whip antenna. Has 6-position tapped switch for various lengths of antenna. In metal housing 6" H. x 9½" W. x 6¾" D. Shpg. wt. 6 lbs.
EACH $7.95

All Above Material Subject to Prior Sale. 25% Minimum Deposit with All C.O.D.'s. Min. Order —$5.00. All Prices F.O.B. Our Address.

—TELEMARINE—
COMMUNICATIONS CO., INC.
142 WEST B'WAY, NEW YORK 13, N. Y.
PHONE: COrtlandt 7-5444

30-40 MC DELUXE FM RECEIVER FOR MOBILE POLICE & FIRE CALLS

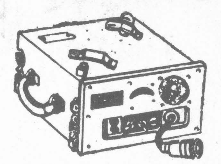


This FM receiver, the R-237 part of an AN/VRC-2 Eqpt., is a single channel-crystal controlled receiver covering industrial, police, and fire dept. frequencies. It is of superior design and construction with all of the best features such as: double-conversion superhet (455 KC and 4.3 inc. I.F.'s) with both oscillators crystal-controlled, noise squelch, double limiter stages, loud-speaker output, etc. Exceptionally well built to provide constant trouble-free service. Uses a total of 13 tubes, 2 in the vibrator-power supply which is designed for 6 V. DC operation. All units are in practically like-new condition and exceptionally clean. Dimensions with removable cover, illustrated. 11½" x 10" x 15". Separate loudspeaker, or phones (if desired) required. Supplied with tubes and schematic diagram, but less crystals, loudspeaker, etc. Shpg. wt. 65 lbs.
PRICE, EACH, Not tested **$29.95**
CRYSTAL, for 2nd Conv. Osc., 4755KC. **$1.50**
CONTROL UNIT, contains Squelch & Vol. Controls, Pilot Lights, On-Off Switches, for both Rcv'r. & Trans.
EACH $5.95

TRANSMITTER COMPANION for ABOVE

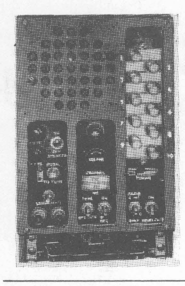
Transmitter T-193/VRC-2 complements the Receiver described above, to provide FM voice transmissions in the 30 to 40 MC band. Transmitter is crystal controlled, and provides a power output of 25 watts. Transmitter is same as Galvin (Motorola) type FMTR-25-VM, and is physically the same in appearance as the receiver shown above. Designed for operation from 6V. DC, has self-contained power supply which in some instances is Dynamotor, in others Vibrator Power Pack. All units are in Used-Excellent condition, in fact almost "Like-New," but are untested at the Low Price we are quoting. Supplied with tubes, schematic diagram, but less crystal or control head. Shpg. wt. 70 lbs.
PRICE, EACH Transmitter T-193/VRC-2, as described **$19.95**

BC-659 TRANS-RECEIVER CONVERT TO CITIZENS BAND



June-'59 issue of CQ Magazine furnishes the necessary conversion data to convert this low-priced Trans-Receiver for satisfactory operation in the new Class D Citizens Band. This Transmitter-Receiver, in its unmodified form, operates over a frequency range of 27.0 to 38.9 MC, has 2 crystal-controlled channels directly controlling the Receiver frequency and through AFC action controlling the Transmitter frequency. It is rated at 2 watts power output. Voice FM, and uses a total of 14 loktal type, low-drain filamentary tubes. Its compact dimensions, 11⅞" x 16⅜" x 21½", with built-in loudspeaker and Meter Indicator makes it ideally suitable for under-dash installation. Power Supply is separate either dry batteries or Vibrator Power Supply PE-120 which operates from 6, 12, or 24 Volts DC. All units are with tubes, and USED-VERY GOOD (untested) condition. Shpg wt. 50 lbs.
BC-659, USED-GOOD as des. EACH $10.95

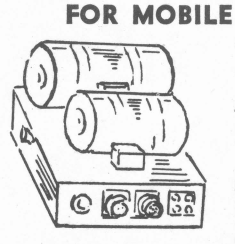
BC-683 MOBILE FM RECEIVER



Provides 10 push-button selected channels as well as continuous variable tuning over the entire range of 27.0 to 39.0 mc. Includes features such as: built-in loudspeaker, squelch circuit, A.V.C., double limiter circuits, headphone jacks, sensitivity control, accurate calibrated tuning dial, etc. Supplied complete with 12V. DC Dynamotor for 12-volt operations, all tubes, and schematic diagram which is glued to bottom of housing case. Shpg. wt. 65 lbs.
PRICE, EACH, Used-Excellent Condition. Not **TESTED $24.95**

BC-221 FREQUENCY METER. The best instrument possible for determining frequency of transmitter or receiver, alignment, testing, etc. Laboratory Precision! Range 125 KC to 20,000 Kc. Complete with Calibrating Crystal, tubes, matching Calibration Book. Tested, Used—Excellent. Shpg. wt. 65 lbs. .... **EACH $74.50**

TCS—12 V DC POWER SUPPLY FOR MOBILE OR MARINE



Famous TCS eqpt. dual-dynamotor complete Power Supply, containing separate dynamotors for Transmitter and Receiver sections. Input is 12 V DC; Transmitter dynamotor output is 440 V DC at 200 ma; Receiver dynamotor output is 220 V DC at 100 ma. Complete input (RF and Hash) and output filtering, plus incorporated heavy-duty 12 V DC starting relay for tranmitter dynamotor. 3 Cannon connectors on side (connector plugs extra) for connecting to Transmitter, Receiver, and Remote Control unit. Schematic Diagram furnished with each unit. Dim. of Power Supply: 12¾" long, 7" wide, 7½" high with shock-mtg, bottom plate. NEW-UNUSED. Shpg. wt. 40 lbs. **TCS-12 V DC POWER SUPPLY. EACH $17.95**

$2.50

Surplus Schematics Handbook

By

Kenneth B. Grayson, W2HDM

Library of Congress Catalog Card Number: 59-15267

TABLE OF CONTENTS

Introduction

We have received so many hundreds of requests for circuit diagrams of surplus equipment that we are preparing this book in self defense. In it you will find, in addition to the circuit, some info which should be helpful in getting you started on a conversion. Please keep in mind that CQ is always interested in the result of your efforts. Many of these Sows' Ears make wonderful Silk Purses, and should your feet trod firmly over unfamiliar territory in the jaunt why not (once you have untangled the above metaphors) trace out a map for the following tourist. CQ Pays for Articles. With just ordinary luck you can get back many times the price of this book.

APA-38

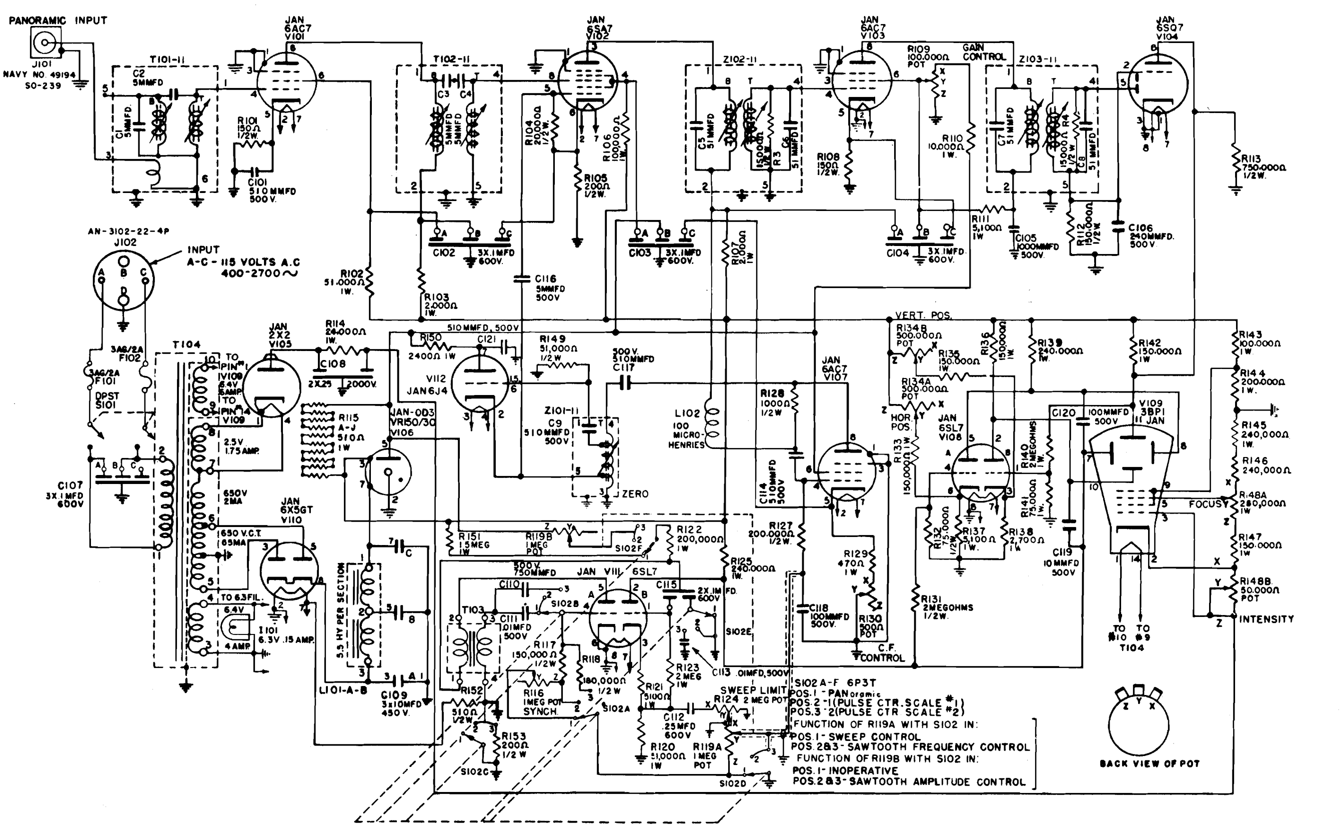
The APA-38 is a Panoramic adaptor which, when connected to your receiver will let you observe the modulation characteristics of received signals and displays visually all signals present in the passband of the receiver IF.

The APA-38 was originally used with the APR-1 and APR-4 Receivers for identification of enemy radar signals. The adaptor may be connected to any communications receiver by tapping into the plate of the first detector (mixer); don't forget to use a blocking condenser and coaxial cable such as RG-58/U.

Since the adapter input is at 30 mc, the IF of the APR-1, you will have to convert from your receiver IF to 30 mc. The APA-38 has an IF of 6.5 mc.

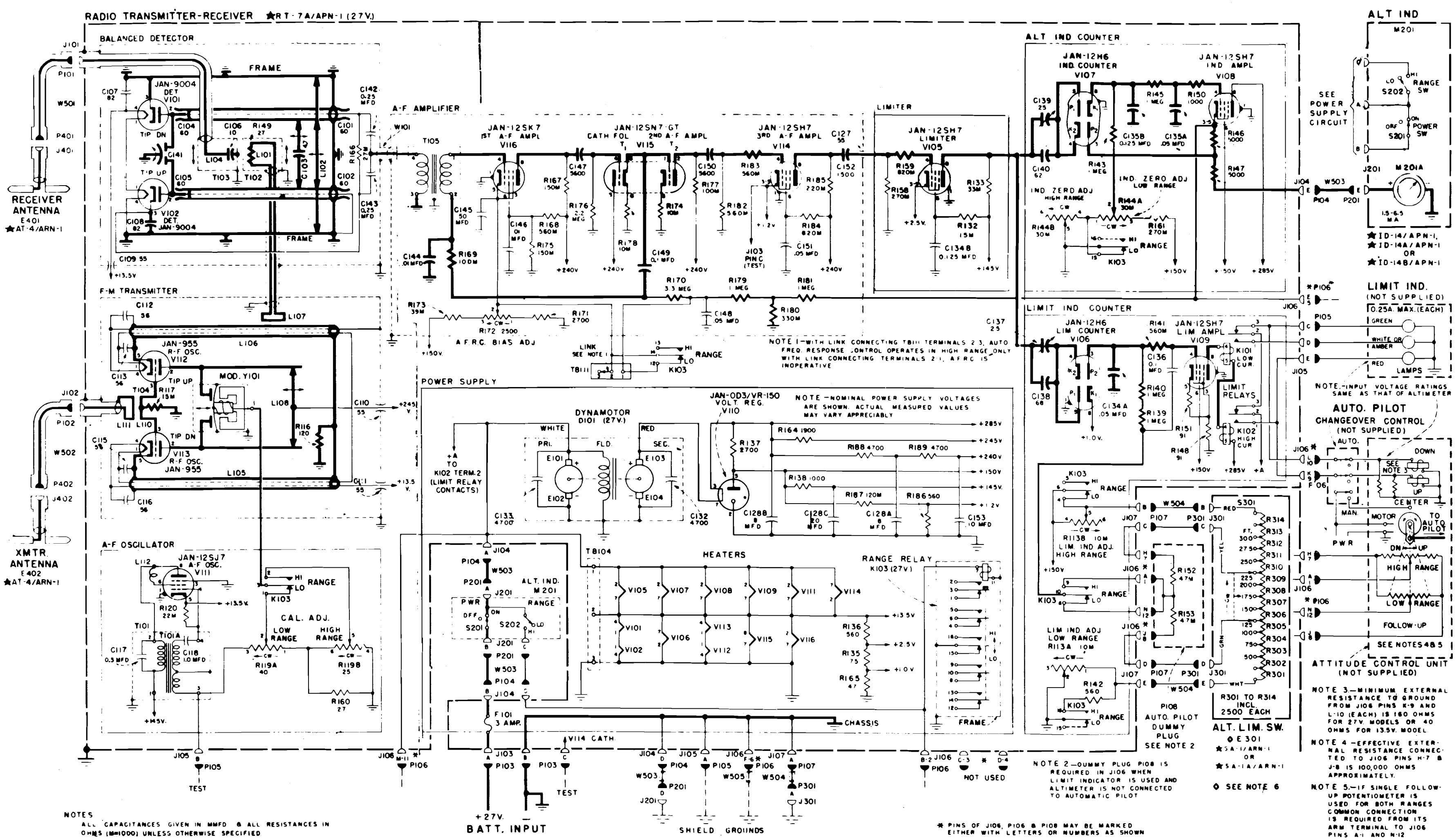
A sweeping oscillator is used to convert the incoming signal, and the sweep voltage is also applied to the scope for synchronization. Provision is made for use of the scope as an oscilloscope for the examination of pulses. The APA-38 RF circuits are stagger tuned to provide the wide response desired.

The sweep oscillator may be reduced in frequency coverage to allow a closer examination of a particular portion of the band. This effectively expands the center portion of the band under examination.



APN-1

This is a radar altimeter using an FM transmitter and receiver in the 420-460 mc band. It uses the Doppler frequency shift principle and indicates the altitude on a dual scale meter (0-400/4000 ft.) The xmtr runs about 1/10th of a watt. There are both 14 and 28 volt models.



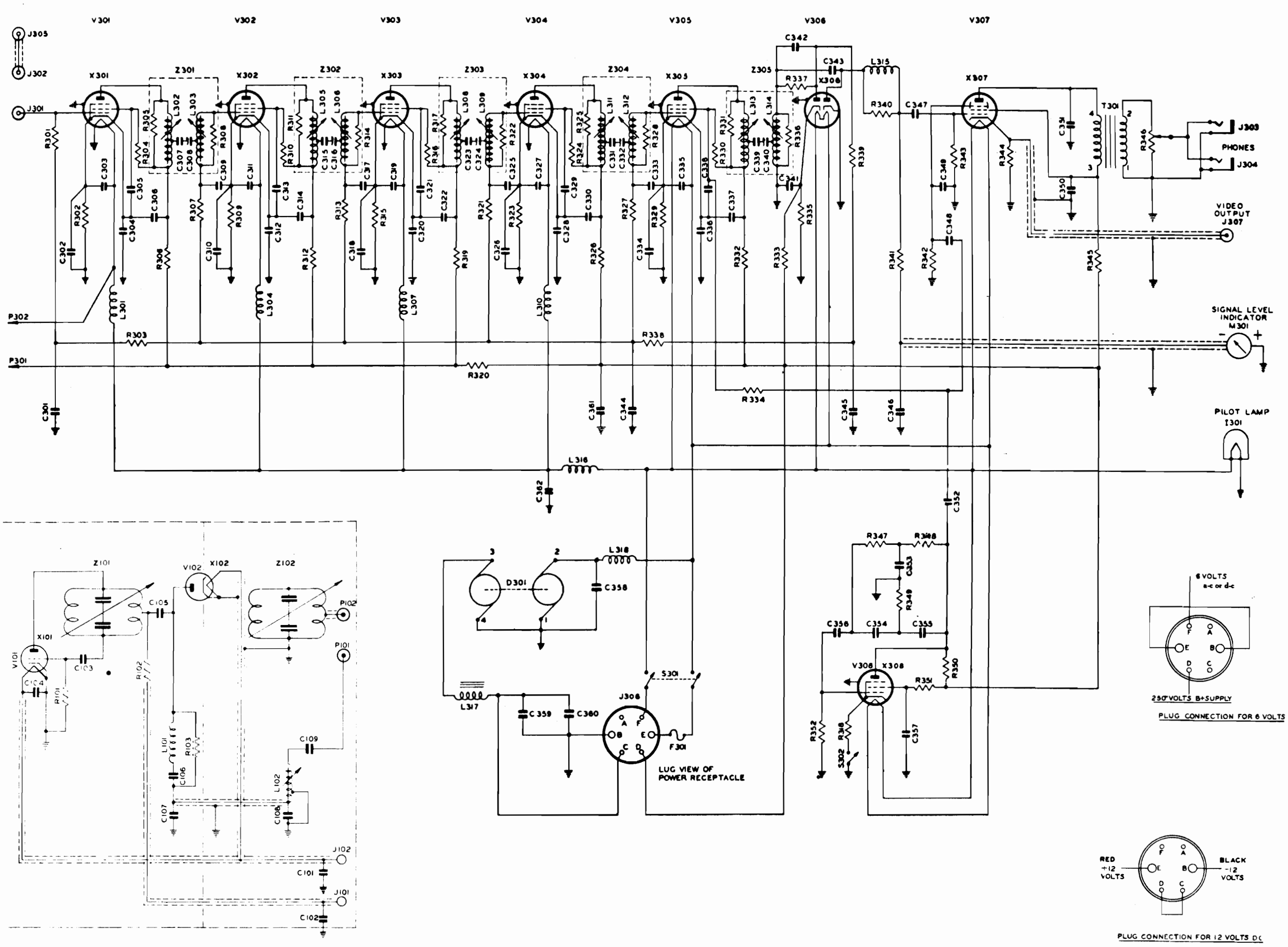
The APR-1 is a Naval Air Force VHF-UHF radar search receiver covering the frequency range of 80 mc to 950 mc in two bands. The basic receiver, without plug-in tuning unit is the CPR-46 ABC. It is essentially an IF amplifier detector audio-video amplifier having a 30 mc input to the IF amplifier. The output impedance is 600 ohm audio and 100 ohm video. A 1000 cycle audio tone can be used as a BFO if a cw signal is being received.

The 80 to 370 mc tuning unit is designated CPR-47 AAE and the 290 to 950 mc band is covered by the CPR-47 AAF tuning unit. Signals can be picked up as high as 2850 mc using harmonics of the oscillator.

Power consumption is 6.25 amperes at 12 volts using the internal dynamotor. Provisions have been made for an external power supply to provide 6 volts ac or dc for the filaments and 250 volts for the plate supply.

Schematic Circuit Diagram of Type CPR-46ABC Radio Receiver Model APR-1

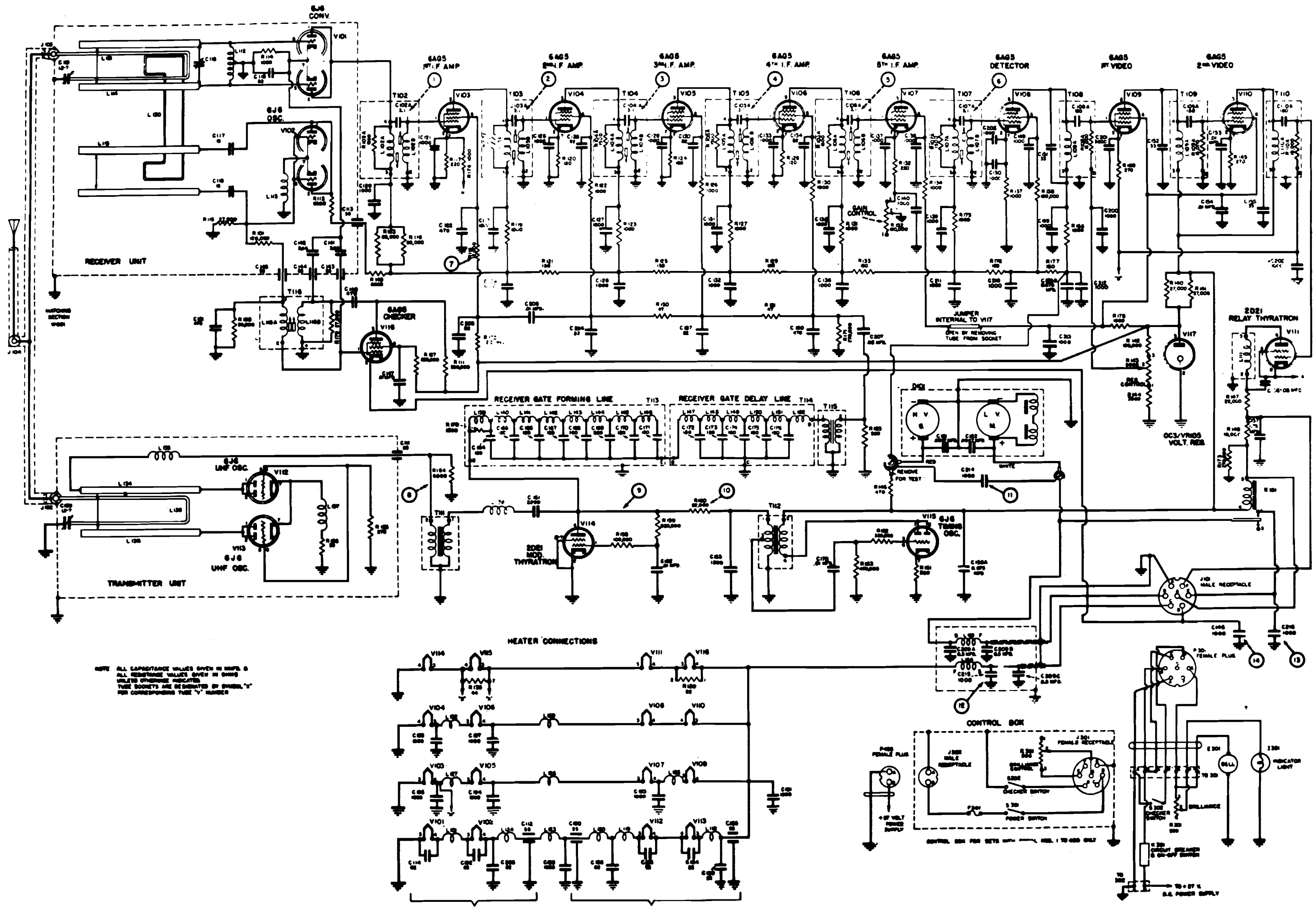
Equipment.



Schematic Circuit Diagram of Type CPR-47 AAE Tuning Unit Range A Model ARC-1 Equipment

APS-13

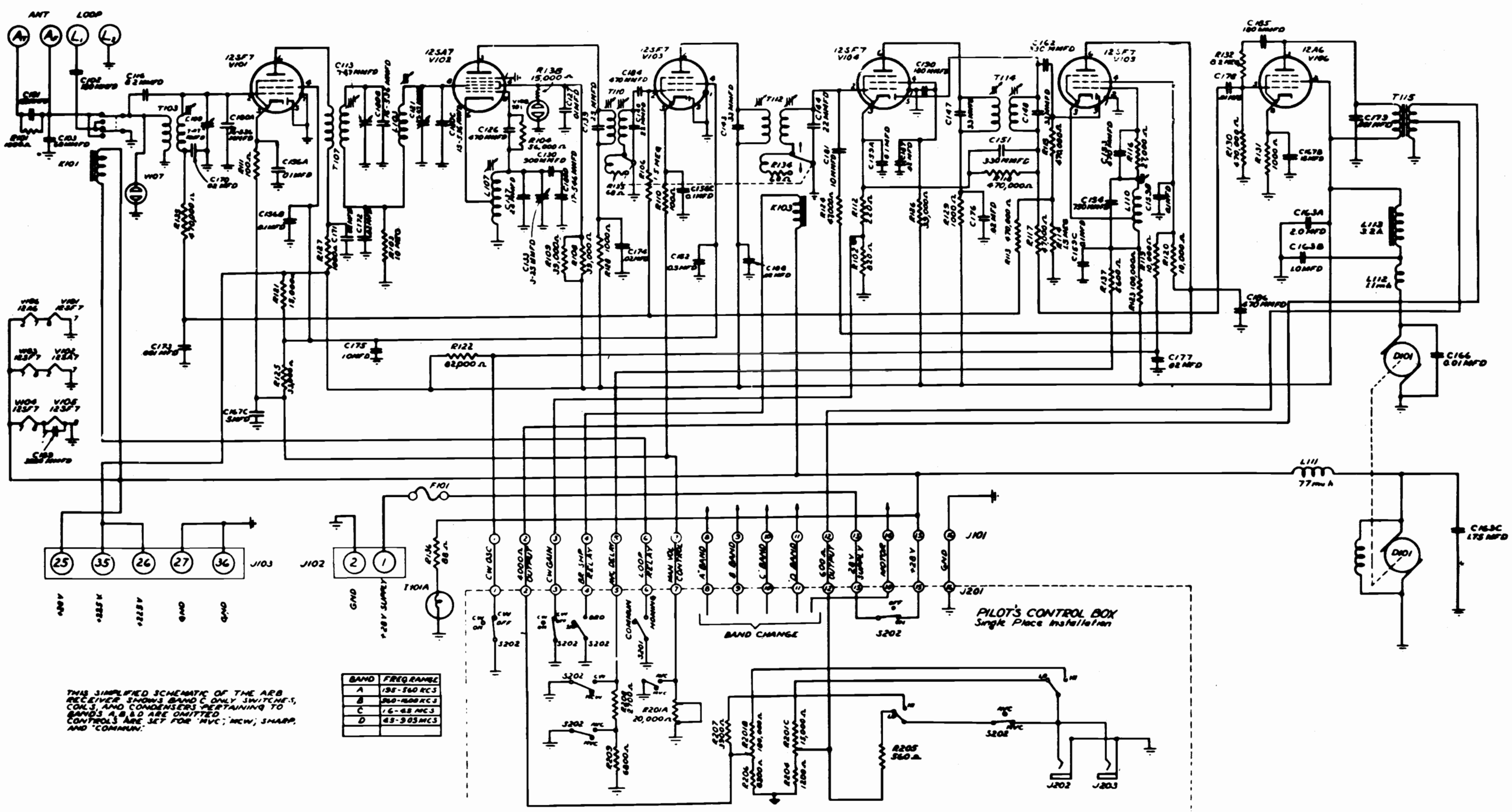
This forest of 6J6's was a 450 mc radar known as "Tail-End Charlie" and was used in the tails of bombers to detect approaching enemy aircraft. It is simple to convert for ham use, though not too effective even at best.



SCHEMATIC DIAGRAM RADIO RECEIVER AND TRANSMITTER APS-13

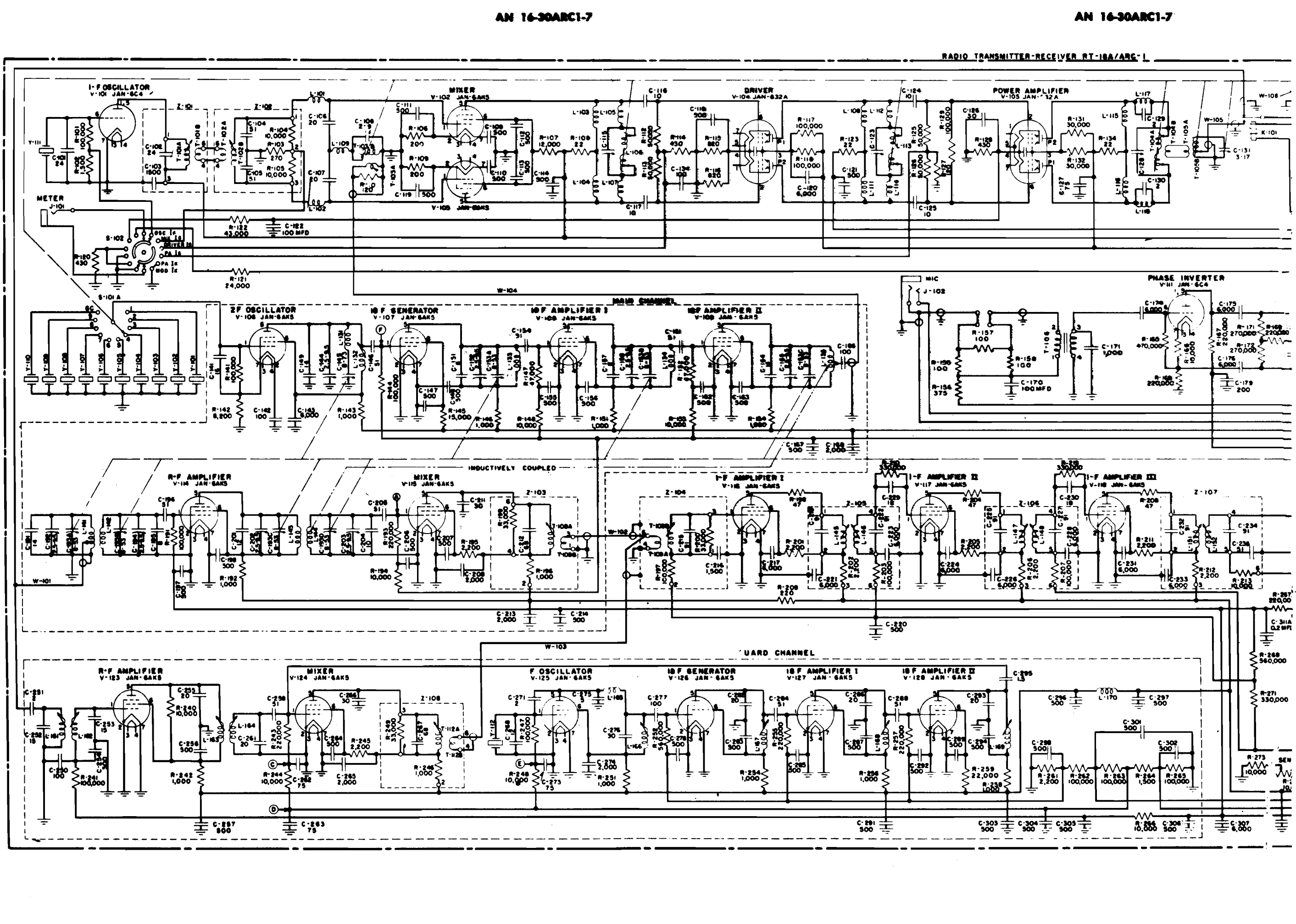
ARB

The ARB is a Navy aircraft receiver which tunes the range 195 kc to 9050 kc in 4 bands using a motor drive for remote tuning. For conversion data, see CQ, June 1958, P. 85.



ARC-1

The ARC-1 is an airborne transmitter receiver covering a frequency range of 100 to 156 mc. It is crystal controlled and uses the same crystal for control of the transmitter and receiver. The IF is 9.75 mc. Power output is 8 watts. The equipment is amplitude modulated. A guard channel is also monitored during reception. The receiver is a conventional superhet, using a crystal multiplication of 18 to obtain the mixing frequency for the proper IF output. On transmit the heterodyne oscillator is mixed with a 9.72 mc signal to obtain the same output frequency.



The equipment is capable of operation on ten channels, each channel being selected with a pre-determined setting of the auto-tune dials. The equipment is designed for remote operation in a plane and requires 28 volts at 7 amperes during reception, and ten amperes on transmit. For short durations during transmission, when switching channels, as much as 15 amperes may be required.

The input is 50 ohms coaxial to a whip antenna, and the output is normally to a headset. A carbon microphone is normally employed with the equipment. Crystals used in the ARC-1 are in the range of 5000 to 8120 mc. The oscillator is below the signal.

AN 16-30ARC1-7 AN 16-30ARC1-7 Section VIII

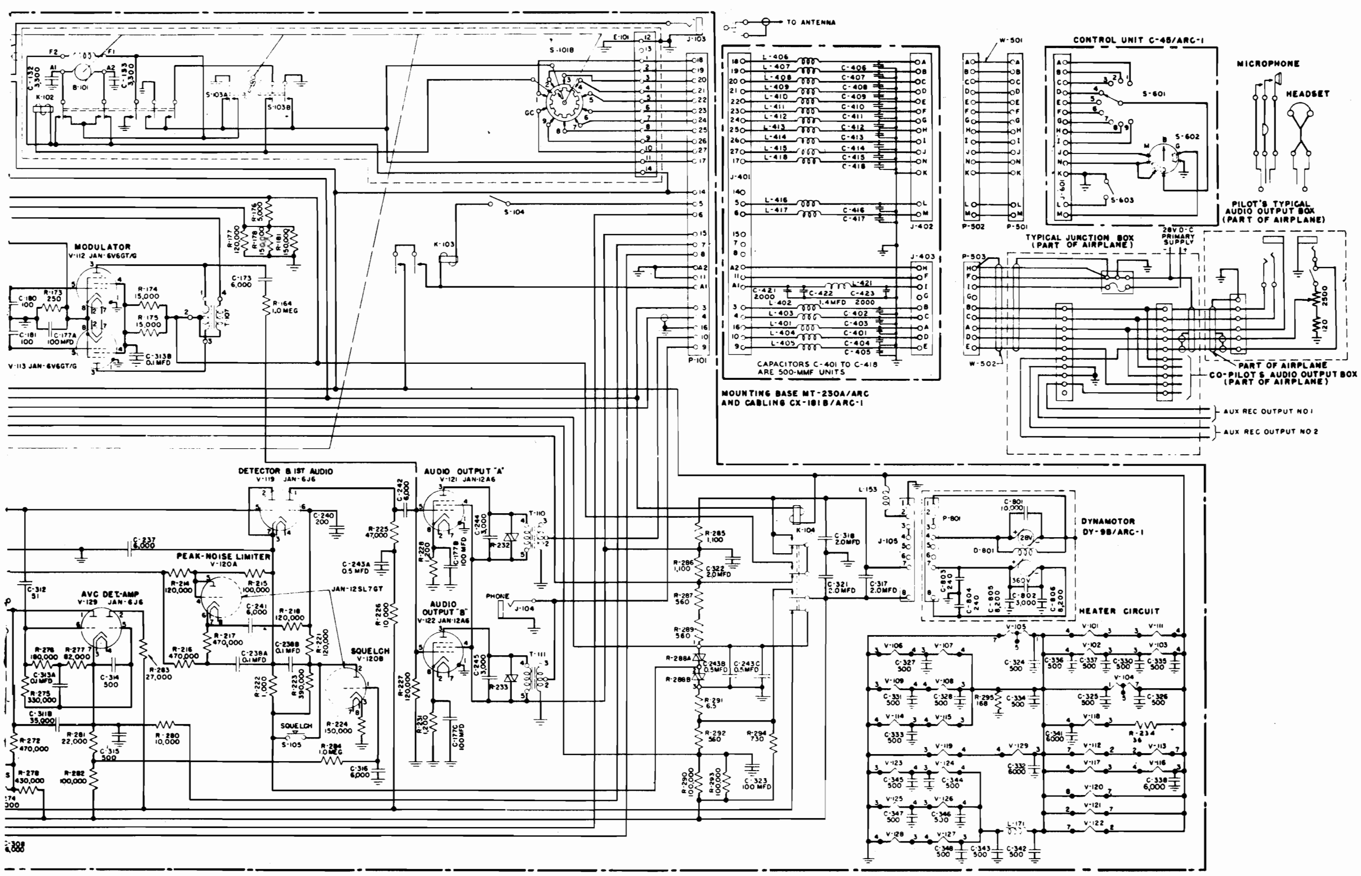


Figure 8-6. Radio Set AN/ARC-1A, Schematic Diagram

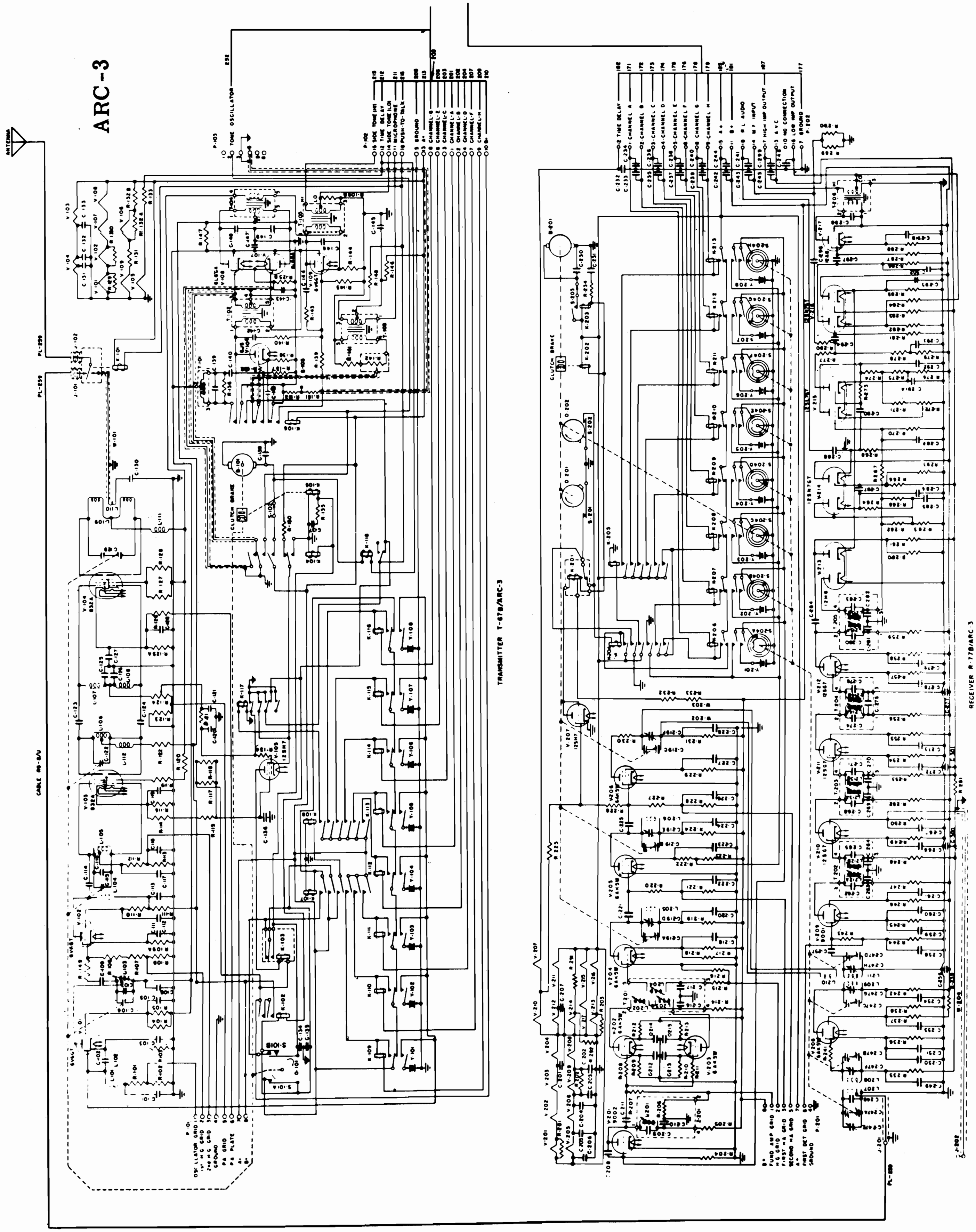
8-11/8-12

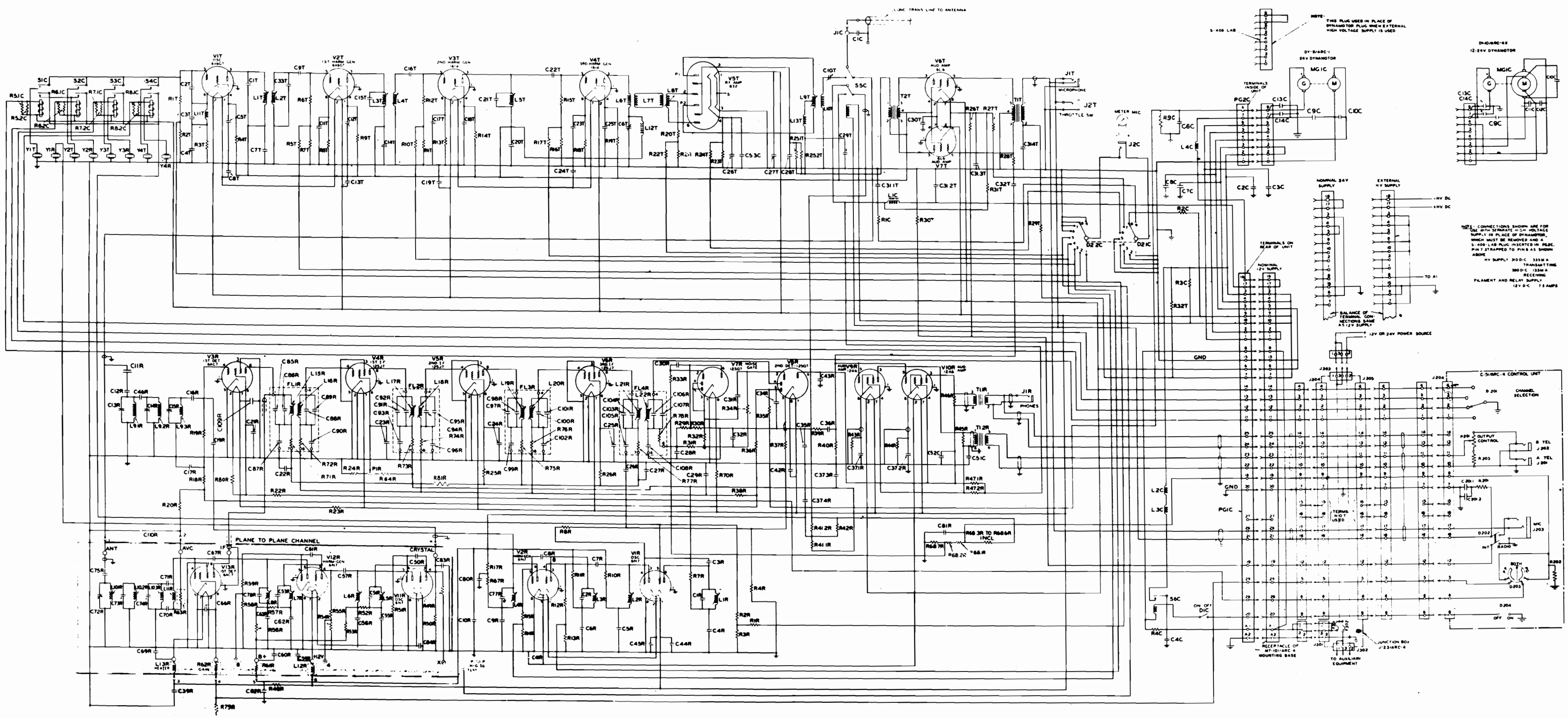
ARC-3

The ARC-3 is basically an airborne radio transmitter-receiver equipment which, with accessories, provides air to air and air to ground communications. It has also been used in some shipboard installations. It operates in the VHF region over the frequency range 100 to 156 mc on eight pre-set frequencies, each of which is crystal controlled. The ARC-3 is tone or voice modulated (AM). It operates from a nominal 28 volts dc at a current of 5.5 amperes on receive and 12 amperes on transmit. The power output is approximately 8 watts.

The transmitter uses nine tubes and is crystal controlled at a frequency 1/18th of the output. The modulator is capable of operation as an interphone amplifier when desired. This is accomplished by a positioning switch (S-103) located at the bottom of the transmitter and accessible from without. A barometric (aneroid) gain control reduces the audio by 6 db at 15,000 feet and 12 db at 25,000 feet. Also in the modulator is a sidetone amplifier which can provide 0.8 watts of audio. The transmitter voltage requirements are 2.45 amperes at 28 volts and 325 ma at 410 volts for full power output.

The receiver is known as the R-77/ARC-3 and is a superheterodyne, crystal controlled with an intermediate frequency of 12 megacycles. The oscillator is on the low side and the crystal used is multiplied from eleven to eighteen times, depending upon the desired receiver frequency. A noise limiter, carrier operated squelch, and AVC are provided to produce a fine piece of equipment. In addition, a flat response between 90 and 150 cycles is provided to allow the use of received navigational signals. The receiver power requirements are 28 volts at 3.5 amperes and 210 volts at 125 ma.


ARC-3
TRANSMITTER T-67B/ARC-3
RECEIVER R-77B/ARC-3



The AN/ARC-4 is a VHF transmitter-receiver operating over a frequency range of 140 to 144 mc. It was primarily used for air-to-air and air-to-ground communications. The rated power output is 8 watts AM. The receiver is a superheterodyne with an IF frequency of 10 mc. The receiver uses two front ends and two individual IF's at 10 mc feeding a common IF of 10 mc. This effectively makes the receiver a dual channel receiver allowing a constant guard of a specific frequency. The receiver uses crystals in the 8 mc range. The transmitter uses crystals in the 6 mc range.

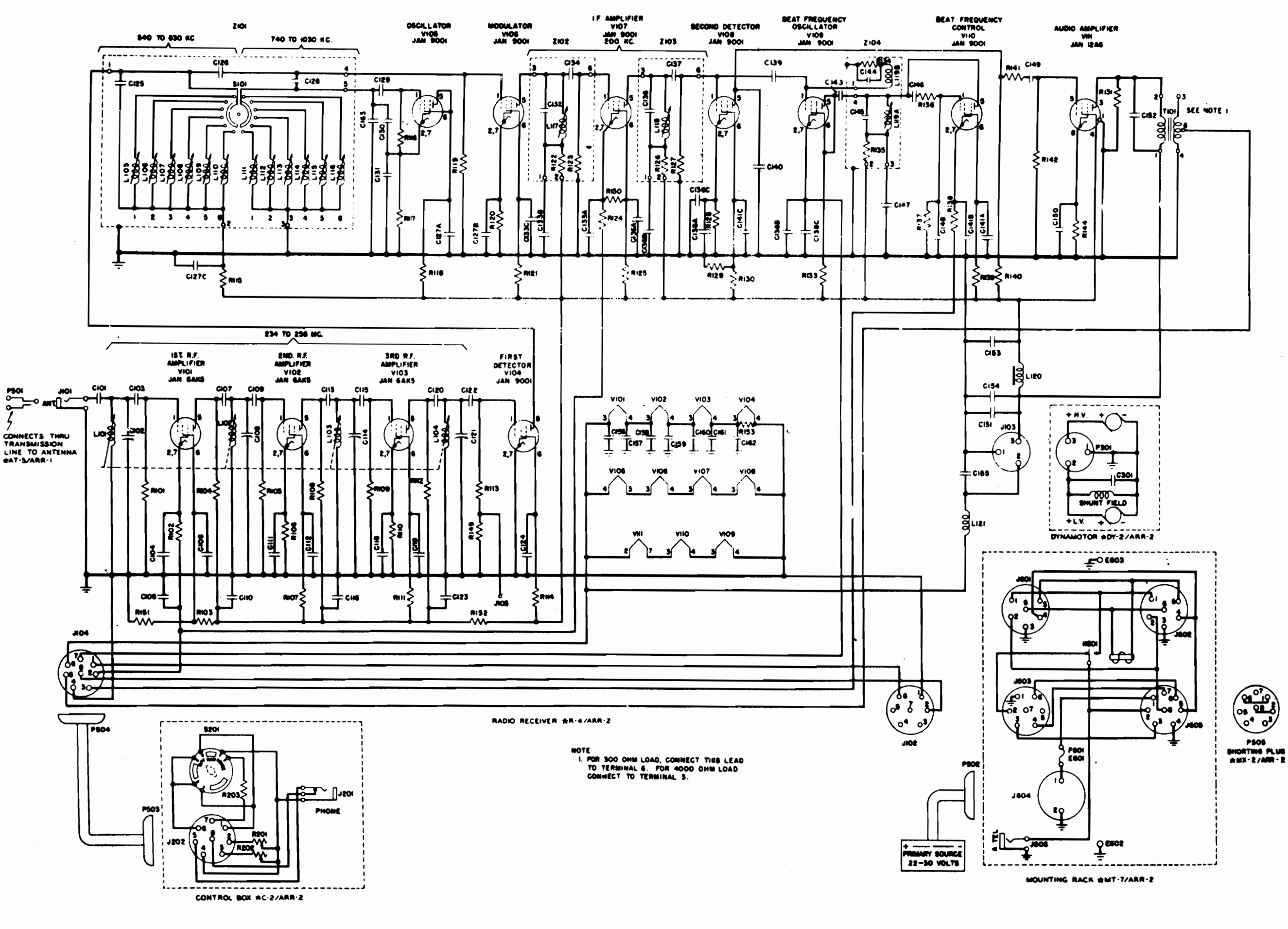
The receiver uses squelch and noise limiters. The set is designed to operate into a 50 to 70 ohm coaxial antenna. A carbon microphone is used. The receiver output is to headsets. Full metering of all stages is provided by a metering switch and provisions for plugging in a test meter which reads proportional currents.

The ARC-4 uses either 12 or 24 volts input depending upon the dynamotor installed. A 12 and 24 volt dynamotor has been provided for some models. Filament switching is accomplished by the dynamotor plug.

Power requirements are 12 volts at 14.5 amps receive and 21 amps transmit. On 24 volts the set uses 7.5 amps on receive and 10.5 amps on transmit. Press to talk operation is provided for.

220 mc conversion (the only practical band to use this unit on). For this conversion the RF coils can be squeezed a bit and an external oscillator fed into J-106. This oscillator may tune either 221-225 mc or 219 to 224 mc.

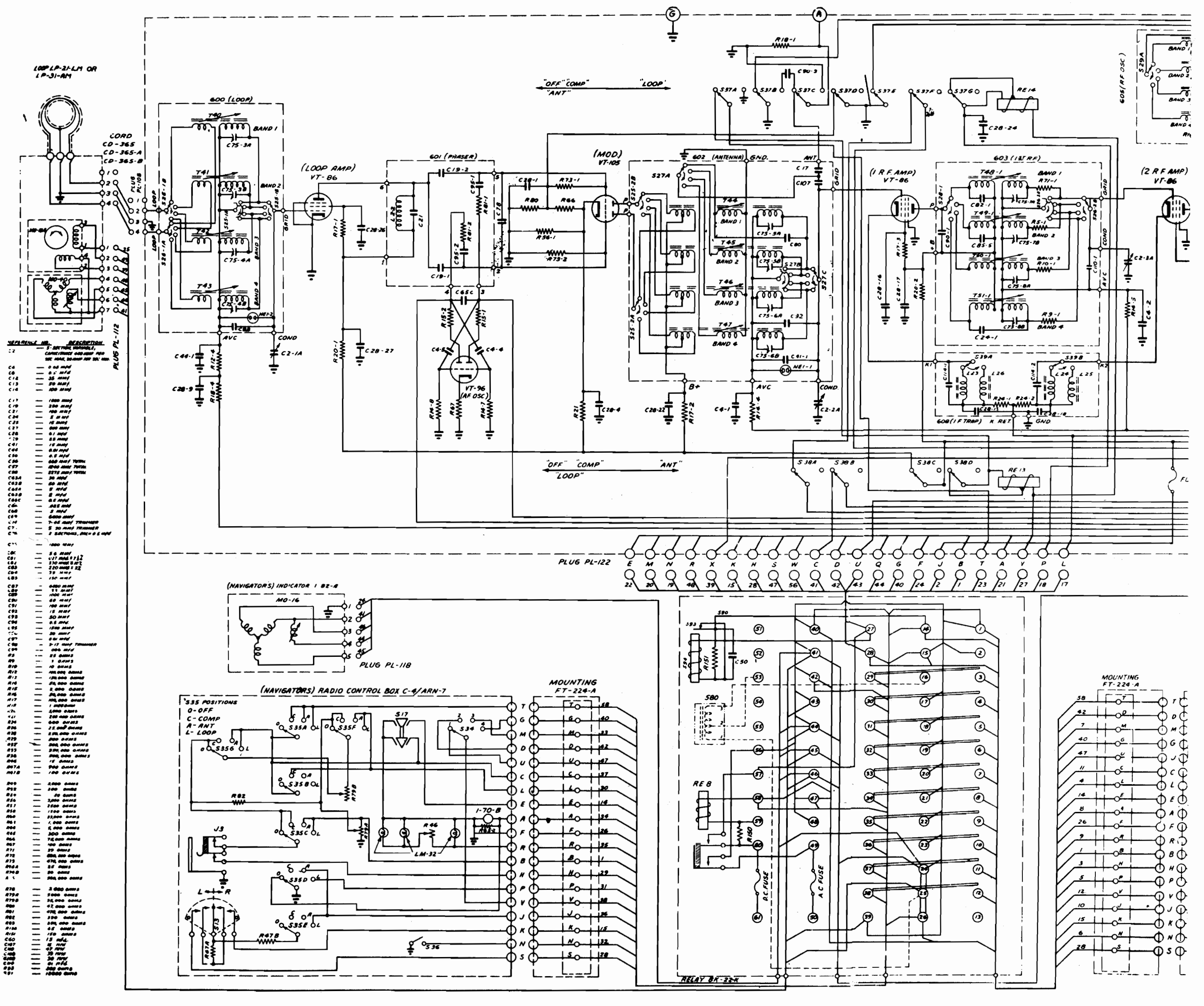
The earlier model of this equipment, the ARR-1, was quite similar circuitwise, but used acorn tubes.



ARN-7

The ARN-7 is an aircraft receiver used primarily for radio direction finding by aircraft. It is a superheterodyne receiver and covers the frequency range of 100 to 1750 kc in four bands. It normally operates from a power supply of 115 volts 400 cycles and a 28 volt supply for the operation of certain relays. When a supply of 12 volts is the only d. c. available the RA-59-A is employed for relay control in addition to the 115 volt 400 cycles.

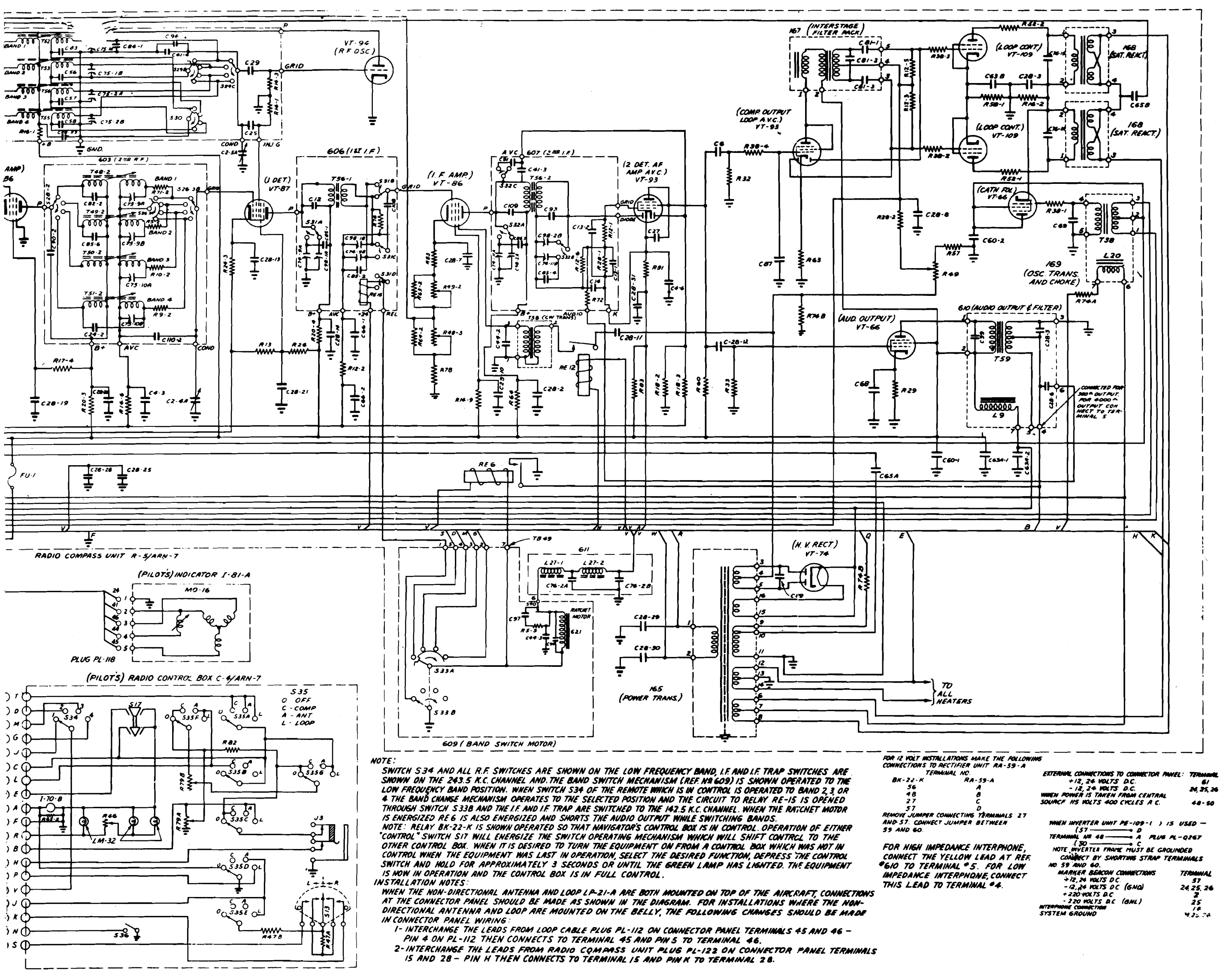
The receiver required a control box C-4/ARN-7 for tuning and operation. Several loop antennas are available such as the LP-21 and the LP-31. A sense antenna is required for proper operation of the direction finder as well. The output is to headsets as well as to indicators when the loop antenna is used. It is not necessary to make use of the loop antenna if direction finding characteristics are not required. The indicators used are the I-81-A and I-81-N panel type and the I-82-A and ID-65/ARN navigators type compass indicator. The indicators indicate the true null bearing of the direction finding loop. The nulling of the loop antenna is either manual, or automatic. When automatic direction finding is employed the loop antenna will automatically locate the station to which the receiver is tuned.



ALIGNING FREQUENCIES

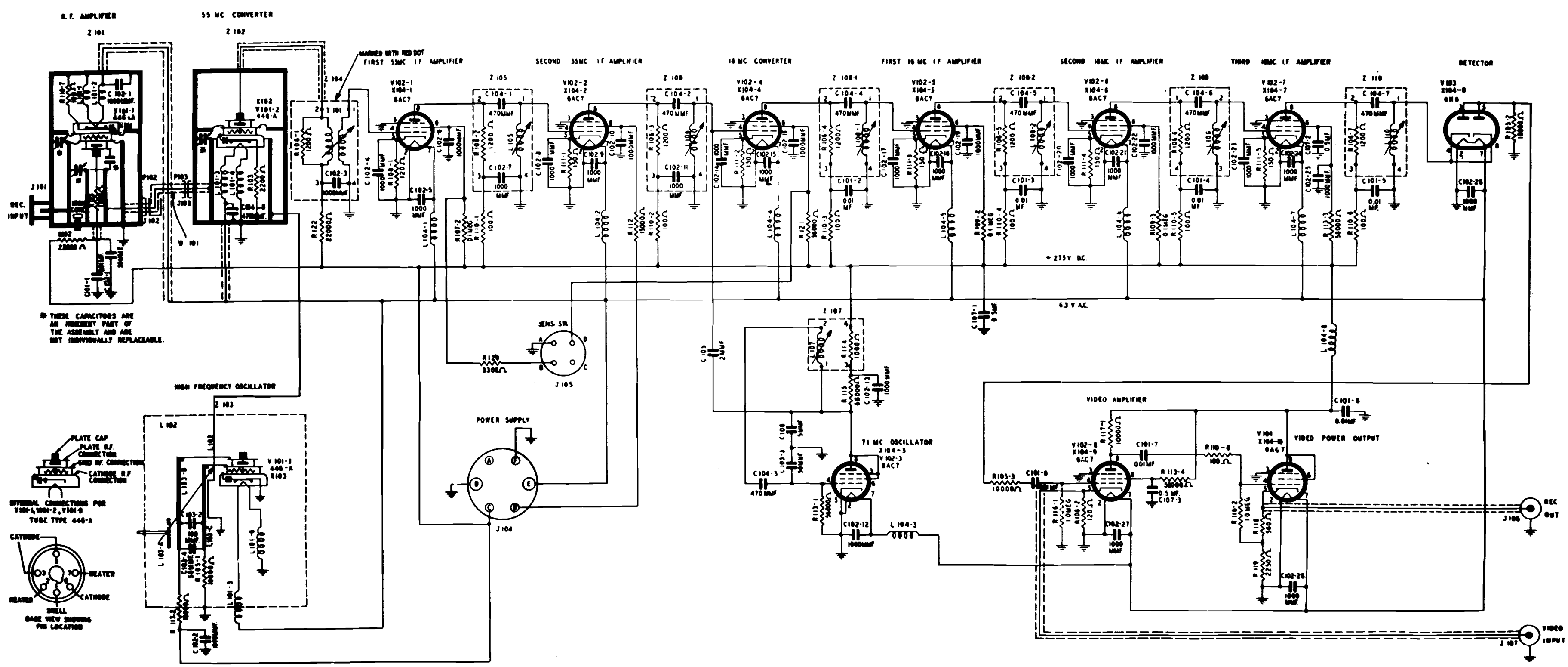
BAND	ALIGN FREQ.	LOOP	ANT	1st RF	2nd RF	Osc RF
100-200 kc	200 kc	C-75-3A	C-75-5A	C-75-7A	C-75-9A	C-75-1A
200-410 kc	410 kc	C-75-3B	C-75-5B	C-75-7B	C-75-9B	C-75-1B
410-850 kc	850 kc	C-75-4A	C-75-6A	C-75-8A	C-75-10A	C-75-2A
850-1750 kc	1750 kc	C-75-4B	C-75-6B	C-75-8B	C-75-10B	C-75-2B

The IF frequencies are 243.5 kc and 142.5 kc depending upon the band setting.



ASB-7

The ASB is a 400 mc range radar receiver with dual conversion to 16 55 mc IF's. For conversion data, see CQ, October 1956, P. 19.



ATK (ARK)

The ATK (ARK) is a television camera, transmitter and receiver for VHF operation. The receiver is a superhet with a 50 mc IF. The ATJ (ARJ) is quite similar except for a 23.5 mc IF. The scanning rate is 14 kc, which can easily be modified to the present commercial standard of 15.75 kc. For conversion data, see May 1957 CQ.

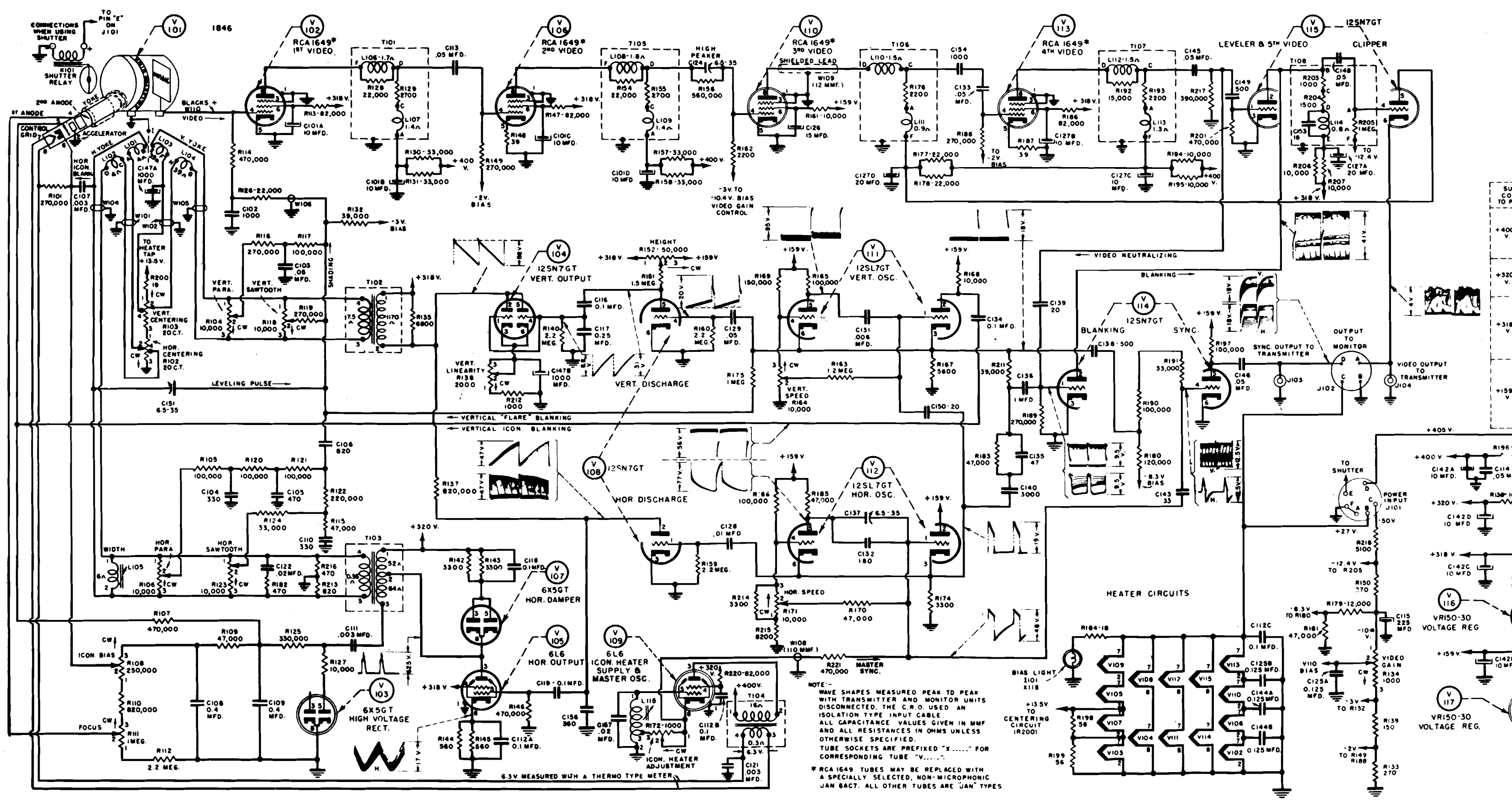
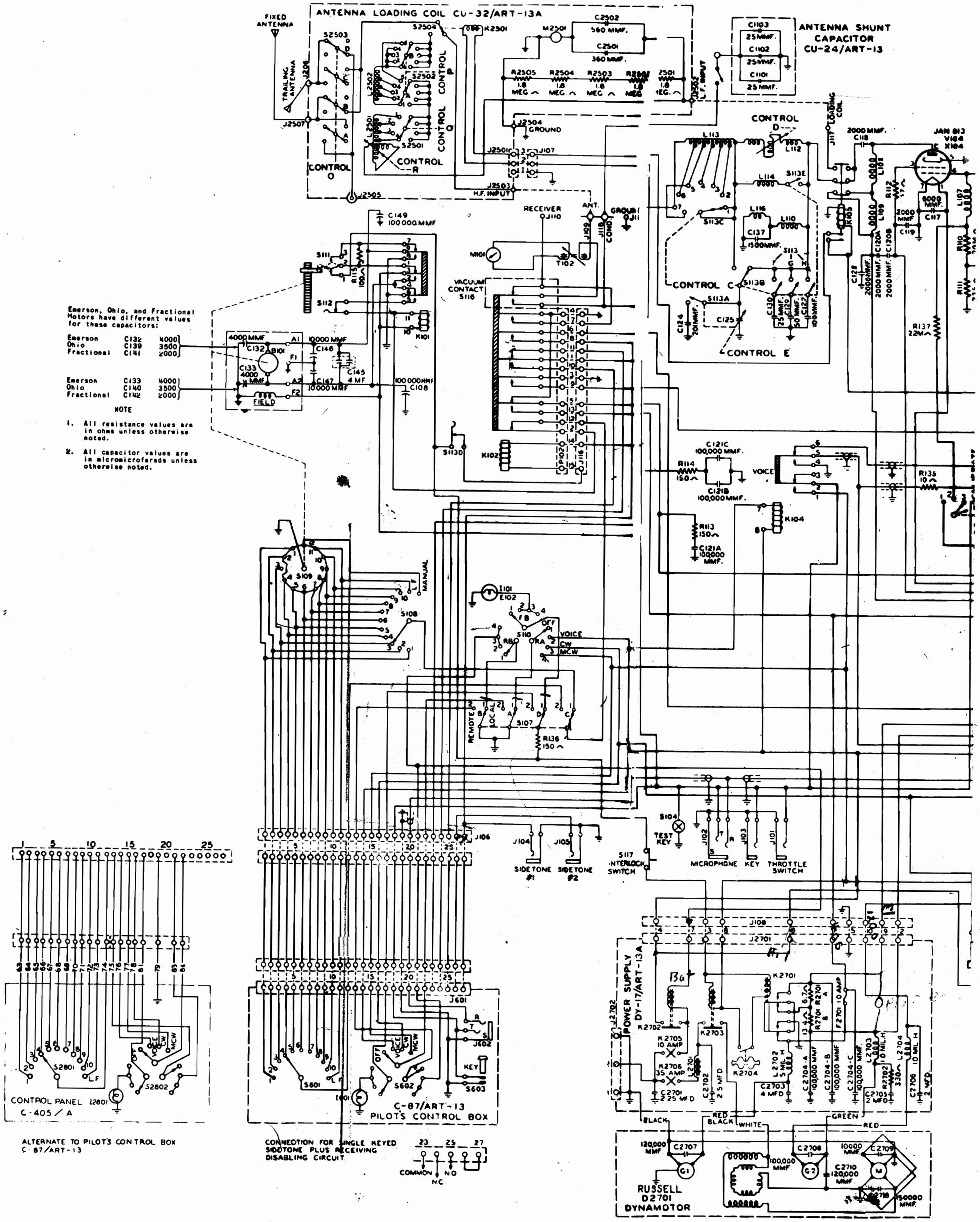


Figure 4—Conversion Unit CRV-59AAE, Schematic Diagram

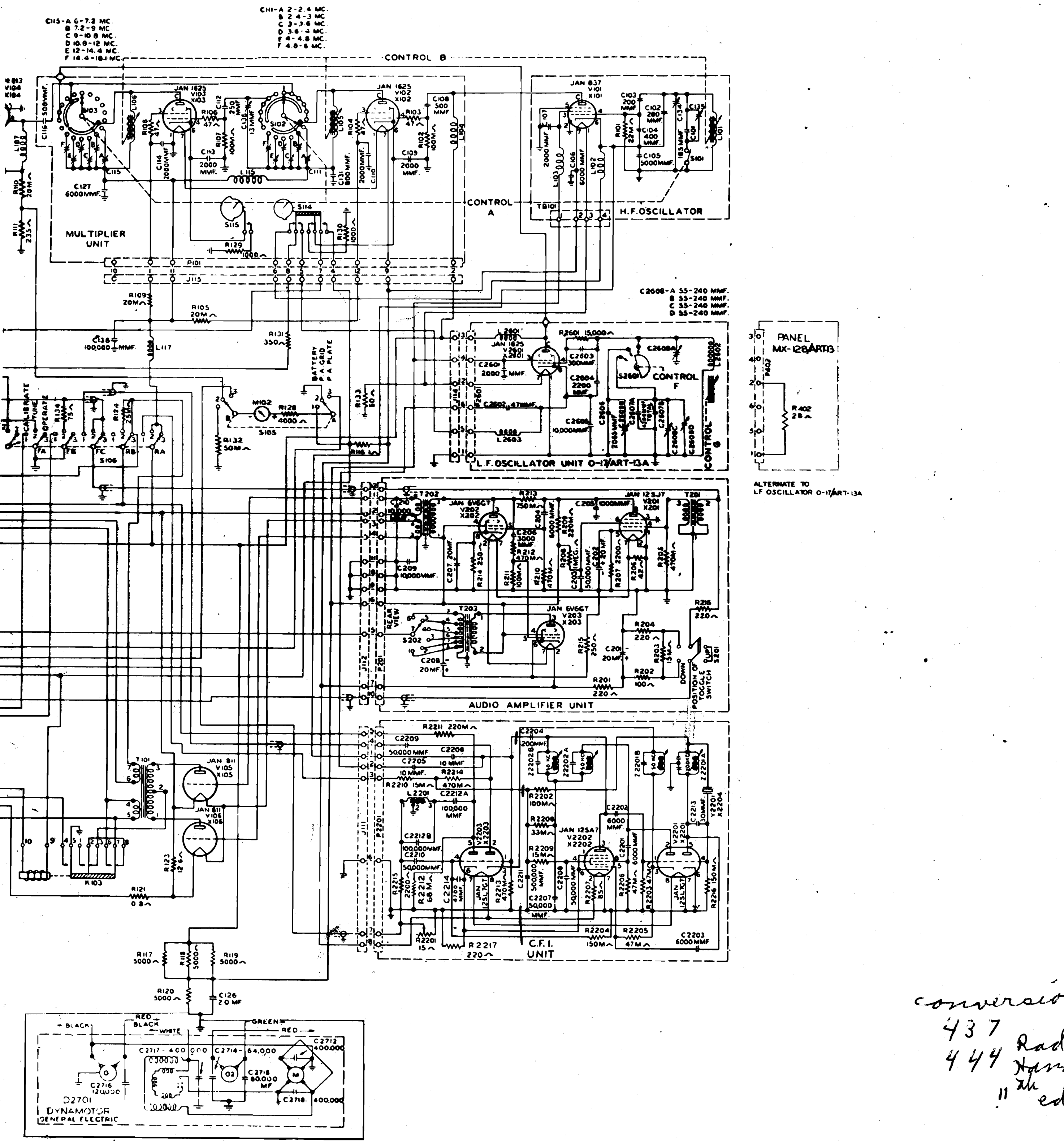
ART-13

The AN/ART-13 is an airborne transmitter for use in patrol aircraft. It covers the frequency range of 2000 to 18,100 kc . Some versions have an additional low frequency band of 200 to 1500 kc. The equipment uses an external dynamotor power supply providing 400 volts dc at 225 ma and 1250 volts at 250 ma. This is in addition to the 28 volts dc for the operation of the tube filaments and motors. The equipment is preset to any frequency within the range specified and may be automat-



ically tuned upon selection of a particular channel by the radio operator. The power output is approximately 200 watts from an 813. The unit uses a VFO, but has a crystal calibrator included to check the frequency. At high altitudes a switch is actuated to reduce power.

Output is either CW or voice, amplitude modulated and keying is accomplished by means of a keying relay.



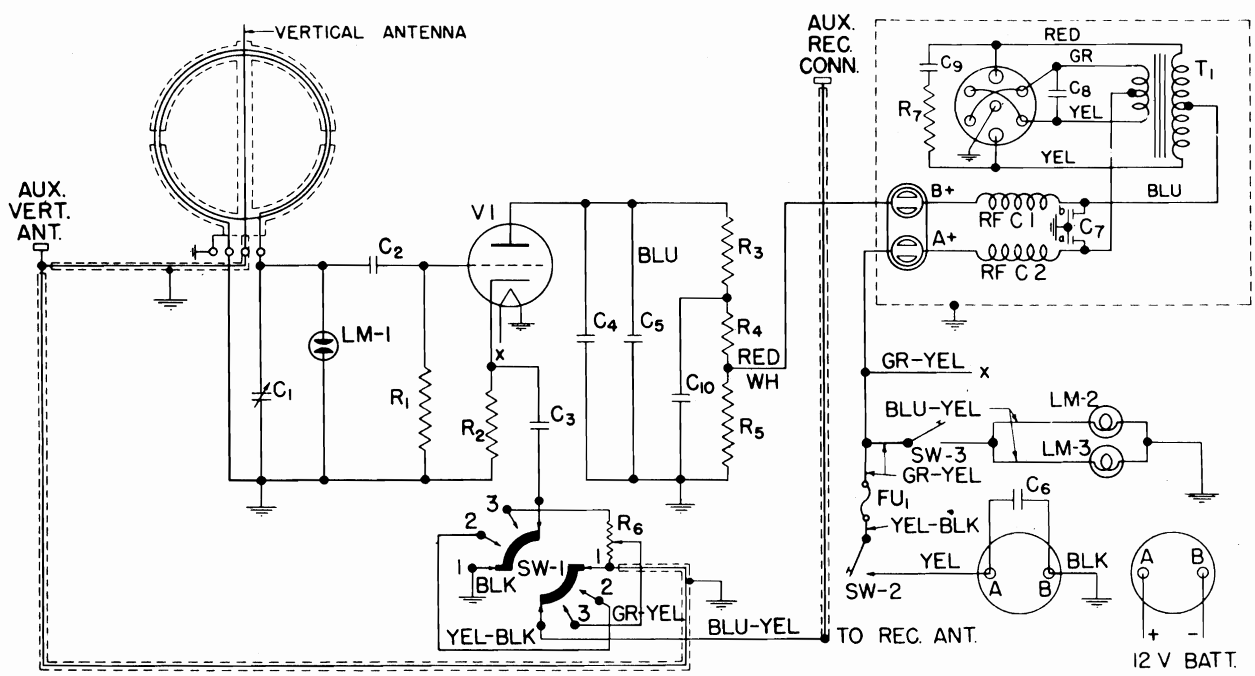
conversion
437
444 Radio Handbook
11th edition

AS-81/GR

The AS-81/GR is a direction finding loop attachment for use with any communications receiver covering the frequency range desired. It uses one of four loops, depending upon the band desired, and supplies loop directivity to the receiver. A twelve volt vibrator within the set supplies all necessary high voltages.

Loop	Color Code	Freq. Range
AT-27/GR	White	1.1 to 2.1 mc
AT-28/GR	Red	2.1 to 4.2 mc
AT-29/GR	Blue	4.2 to 8.5 mc
AT-30/GR	Yellow	8.0 to 16 mc

Provision is made for loop balance and sense to determine the direction of the received signal.

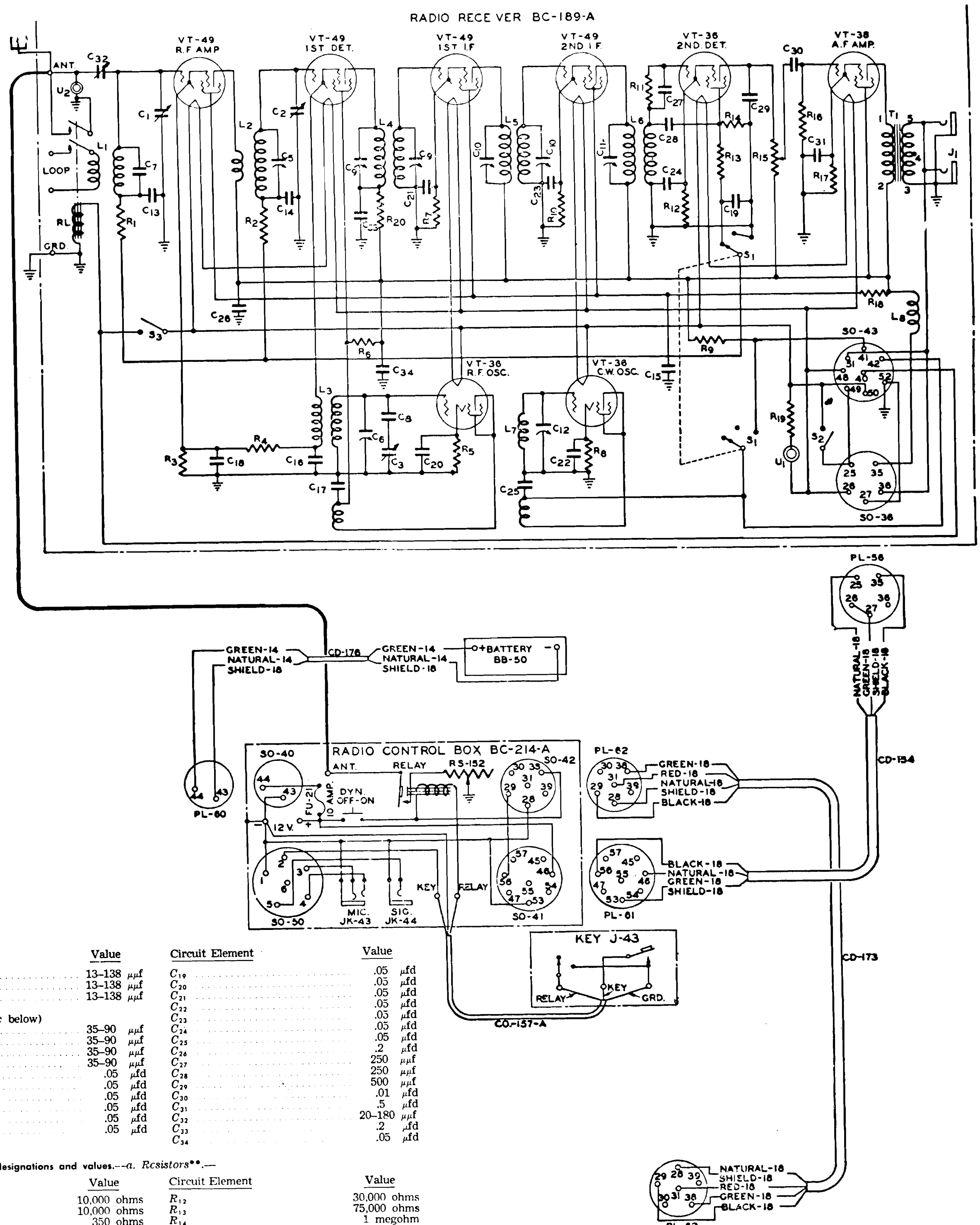


REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION
R_1	1 MEG 1/2 WATT	C_3,C_4	.01 μF 300 V	LM-1	NEON LAMP
R_2	300 Ω 1/2 WATT	C_5,C_6	.25 μF 600 V	LM-2, LM-3	PILOT LAMP
R_3,R_4	50,000 Ω 1/2 WATT	C_{7a}	.5 μF 50 V	FU_1	2 AMP FUSE
R_5	25,000 Ω 10 WATT	C_{7b}	.1 400 V	SW_1	SWITCH, ROTARY
R_6	1500 Ω POT	C_8	1 μF 50 V	SW_2,SW_3	SWITCH, TOGGLE
R_7	5000 Ω 1/4 WATT	C_9	.0025 μF 2000 V	RF C_1	.1 MH 15 Ω
C_1	12-252 μμF	C_{10}	.5 μF 400 V	RF C_2	55 TURNS #16 ENAMELED COPPER WIRE
C_2	600 μμF 500 V	V_1	12 J 5 GT/VT-135	T_1	TRANSFORMER, POWER

BC-189

The BC-189 is a predecessor of the BC-312. It covers the range of 150 kc to 13 mc by twelve sets of plug in coil drawers. The receiver is a superheterodyne with an IF of 470 kc. The BC-189A has an IF of 850 kc. When operating near the IF frequencies some instability will be noted.

Power is supplied by a dynamotor, and the input is 12V dc. Output is to a pair of headsets.



b. Capacitors.—

Circuit Element	Value	Circuit Element	Value
C_1	13–138 μμf	C_{19}	.05 μfd
C_2	13–138 μμf	C_{20}	.05 μfd
C_3	13–138 μμf	C_{21}	.05 μfd
C_4 (none)		C_{22}	.05 μfd
C_5, C_6, C_7, C_8 (see *c* below)		C_{23}	.05 μfd
C_9	35–90 μμf	C_{24}	.05 μfd
C_{10}	35–90 μμf	C_{25}	.05 μfd
C_{11}	35–90 μμf	C_{26}	.2 μfd
C_{12}	35–90 μμf	C_{27}	250 μμf
C_{13}	.05 μfd	C_{28}	250 μμf
C_{14}	.05 μfd	C_{29}	500 μμf
C_{15}	.05 μfd	C_{30}	.01 μfd
C_{16}	.05 μfd	C_{31}	.5 μfd
C_{17}	.05 μfd	C_{32}	20–180 μμf
C_{18}	.05 μfd	C_{33}	.2 μfd
		C_{34}	.05 μfd

Circuit element designations and values.—*a. Resistors***.—

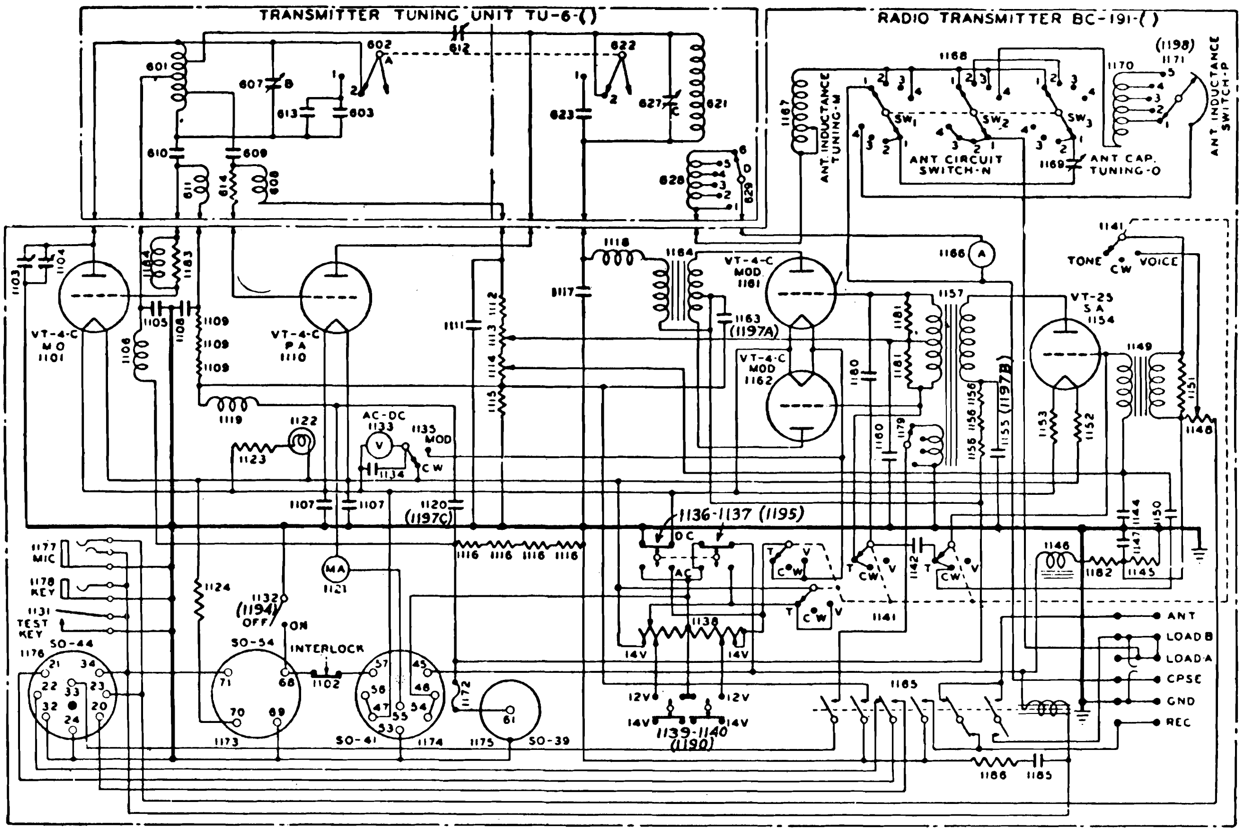
Circuit Element	Value	Circuit Element	Value
R_1	10,000 ohms	R_{12}	30,000 ohms
R_2	10,000 ohms	R_{13}	75,000 ohms
R_3	350 ohms	R_{14}	1 megohm
R_4	3,000 ohms	R_{15}	500,000 ohms
R_5	1,000 ohms	R_{16}	1 megohm
R_6	20,000 ohms	R_{17}	2,000 ohms
R_7	500 ohms	R_{18}	30,000 ohms
R_8	3,000 ohms	R_{19}	60 ohms
R_9	20,000 ohms	R_{20}	1,000 ohms
R_{10}	500 ohms	R_{21}	3,000 ohms
R_{11}	50,000 ohms		

**In addition to the resistors indicated on the circuit diagram of figure 2, coil sets C-142, C-142-A, C-143, and C 143 A have a 200,000-ohm resistor (RS-148) connected to the secondary terminals of both transformers L_1 and L_2.

BC-375 (BC-191)

The BC-375, built by GE, building 89, 1 River Road, Schenectady, N. Y., is an archaic behemoth whose design was finalized in 1935, and was produced in tremendous quantities for war destruction in planes and other expendable vehicles. The design engineers responsible almost had heart attacks when they received an ARC-5 for test comparison and found it to be a fraction of the size and weight, infinitely more stable and put out more power.

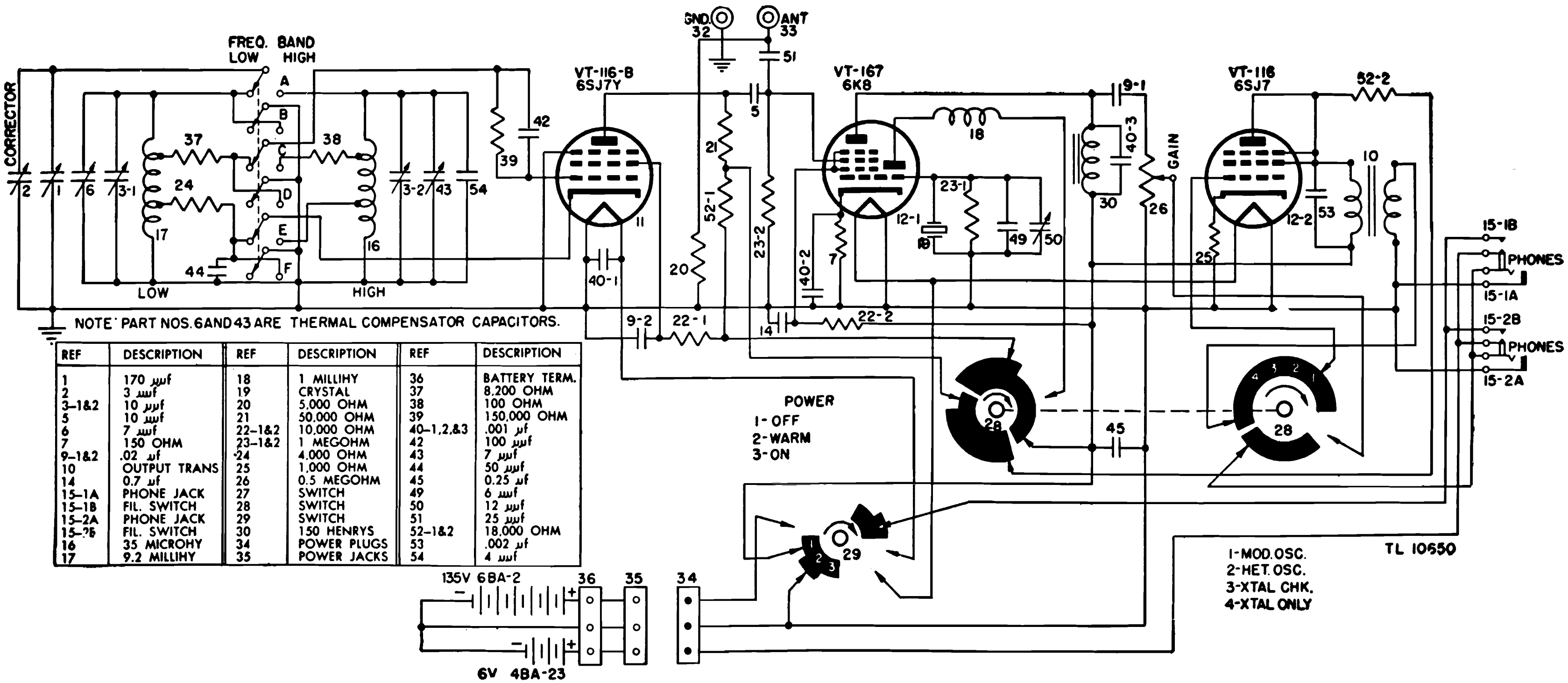
The BC-375 is designed for 28 volts; the BC-191 for 14 volts, otherwise they are almost identical. There are a few moderately usable parts in the transmitter and the tuning units make nice cabinets.



Radio transmitter BC-191-(*) with transmitter tuning unit TU-6-A or -B—schematic diagram.

BC-221 (LM)

The BC-221 is a heterodyne frequency meter with a range from 125 kc to 20,000 kc. It uses a crystal calibrator at 100 kc. For most amateur use a small power supply is built into the battery compartment. The Navy model is designated LM, with the odd numbered models (LM-3, 5, 7) being ac powered. When buying one of these units it is a good idea to get one with the calibration booklet if possible as the dial is not directly calibrated in frequency. This is one of the handiest pieces of test equipment for the hamshack and is available at quite reasonable prices from surplus dealers. No hamshack should be without a precision frequency meter. For conversion data, see CQ, April, 1959, P. 79.

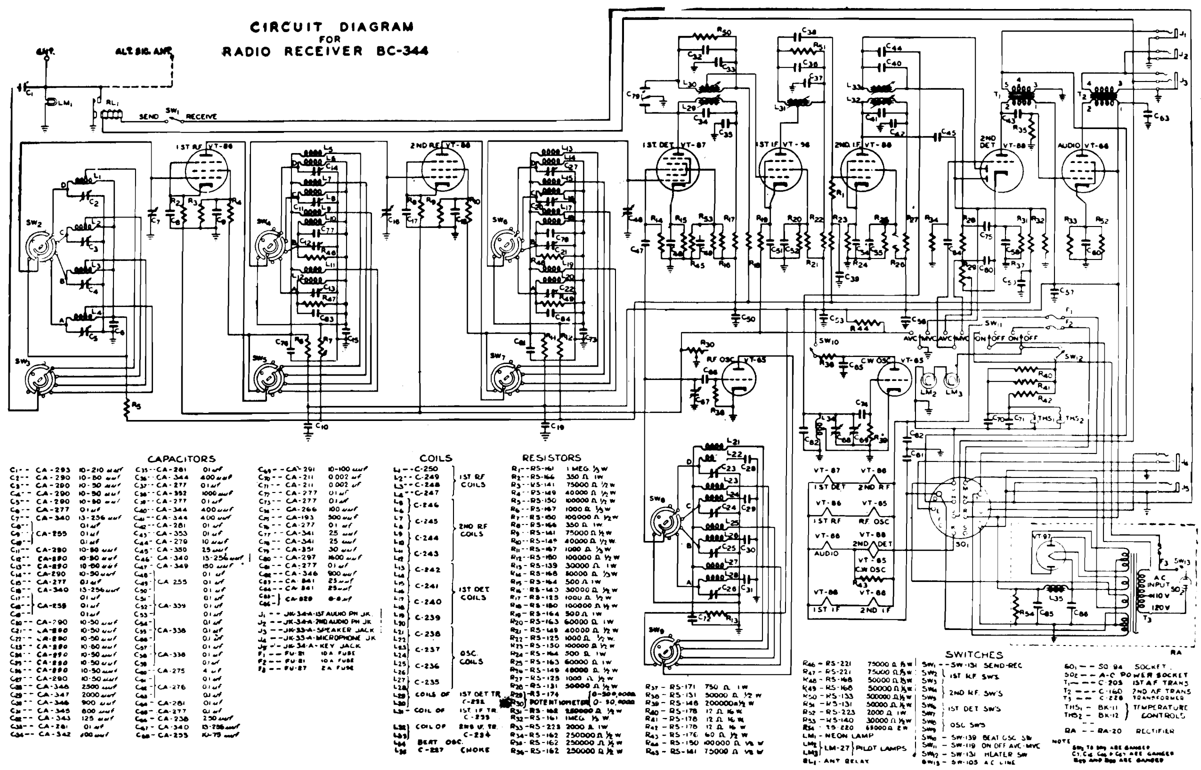


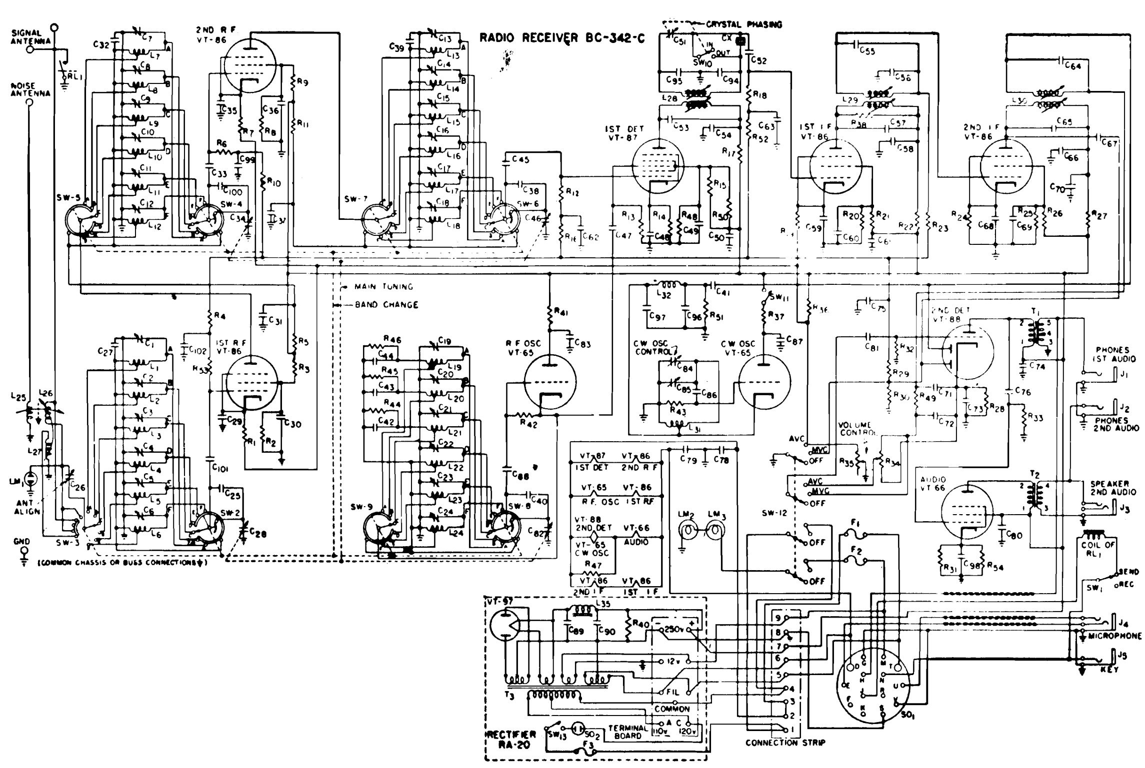
NOTE: PART NOS. 6 AND 43 ARE THERMAL COMPENSATOR CAPACITORS.

REF	DESCRIPTION	REF	DESCRIPTION	REF	DESCRIPTION
1	170 µµf	18	1 MILLIHY	36	BATTERY TERM.
2	3 µµf	19	CRYSTAL	37	8,200 OHM
3-1&2	10 µµf	20	5,000 OHM	38	100 OHM
5	10 µµf	21	50,000 OHM	39	150,000 OHM
6	7 µµf	22-1&2	10,000 OHM	40-1,2,&3	.001 µf
7	150 OHM	23-1&2	1 MEGOHM	42	100 µµf
9-1&2	.02 µf	24	4,000 OHM	43	7 µµf
10	OUTPUT TRANS	25	1,000 OHM	44	50 µµf
14	0.7 µf	26	0.5 MEGOHM	45	0.25 µf
15-1A	PHONE JACK	27	SWITCH	49	6 µµf
15-1B	FIL. SWITCH	28	SWITCH	50	12 µµf
15-2A	PHONE JACK	29	SWITCH	51	25 µµf
15-2B	FIL. SWITCH	30	150 HENRYS	52-1&2	18,000 OHM
16	35 MICROHY	34	POWER PLUGS	53	.002 µf
17	9.2 MILLIHY	35	POWER JACKS	54	4 µµf

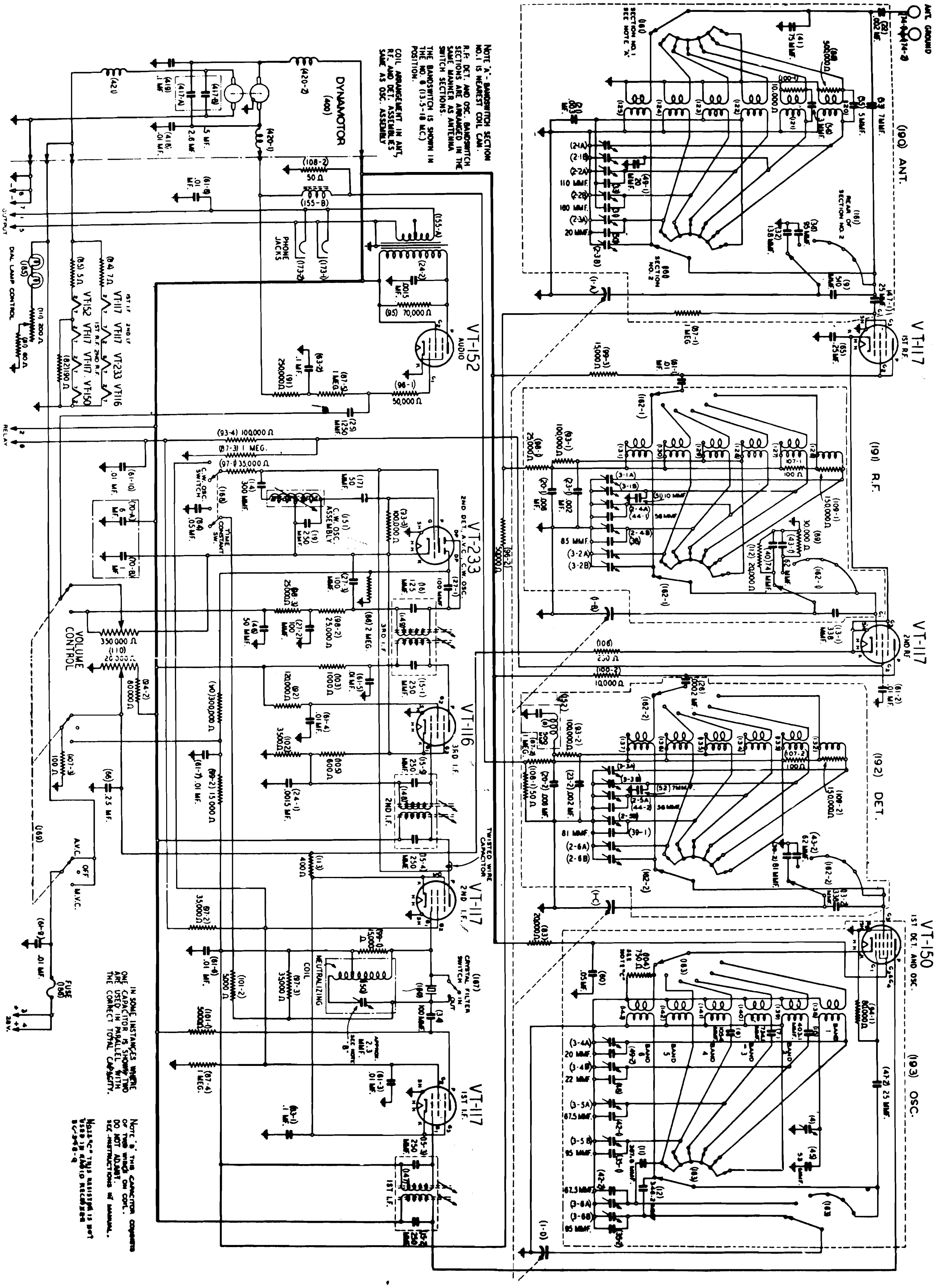
These equipments are receivers used for communications purposes. They are basically identical in appearance. The BC-312 is a superheterodyne receiver covering a frequency range of 1500 to 18,000 kc. It operates from a 12 volt source (dc) at about 7 1/2 amperes, for those models with thermostatic heaters for oscillator stability, and about 4.5 amperes for those models without such heaters. An ac model, operating at 110 volts ac is known as the BC-342. Those models using heaters consume about 100 watts, while those without use about 75 watts. The intermediate frequency is 470 kc.

The BC-314 is the low frequency counterpart of the BC-312. It operates over a frequency range of 150 to 1500 kc. It has an IF of 92.5 kc. The BC-314 has an ac counterpart in the BC-344.



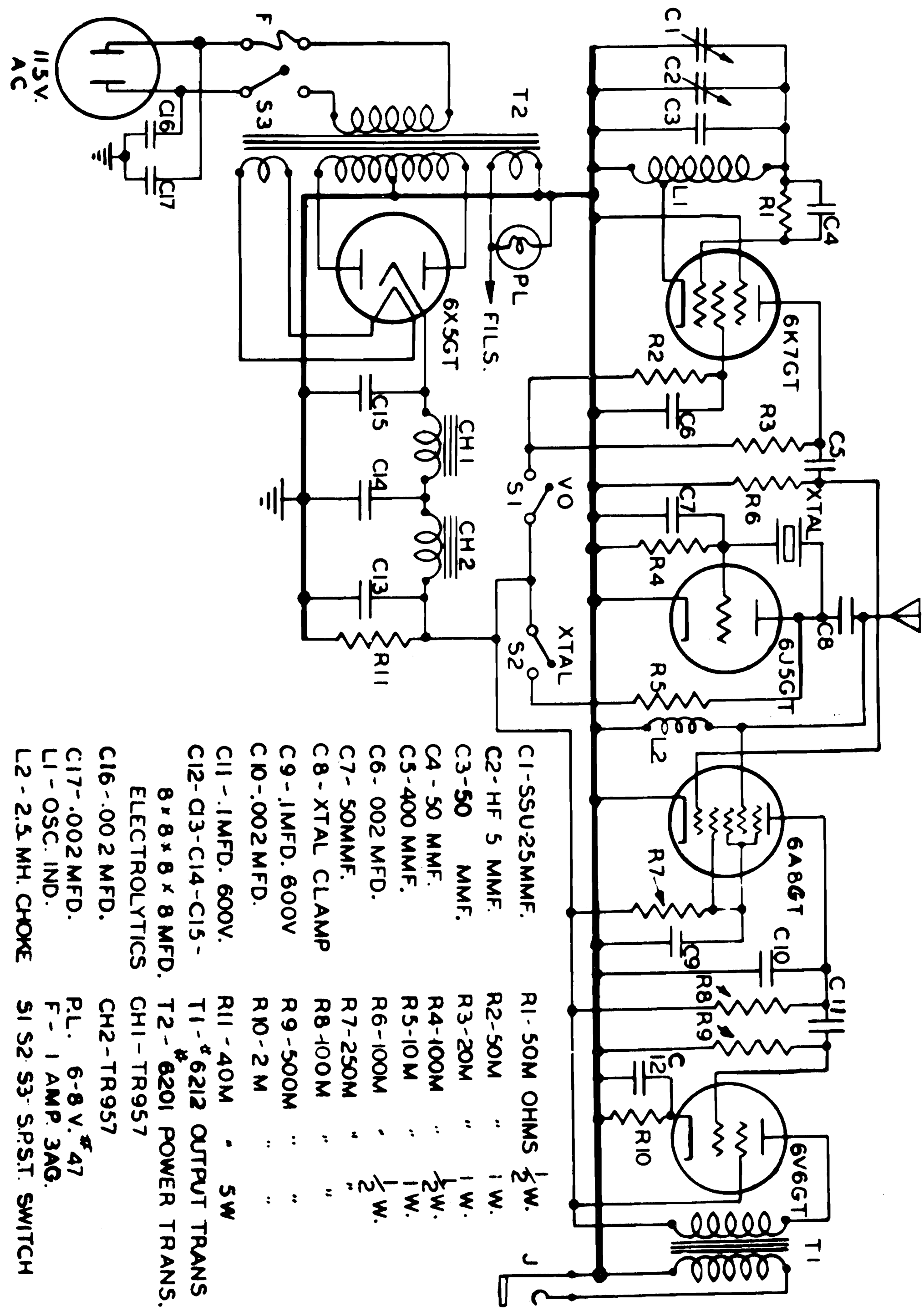


The BC-348 is essentially the same as the BC-312 series of receivers, however it is considerably broader with respect to selectivity. The BC-348 covers the range 950 kc to 18 mc with an IF of 915 kc. This is a pretty good receiver for the amateur. For conversion data, see CQ Sept., 1956, February, 1959 and March, 1959.



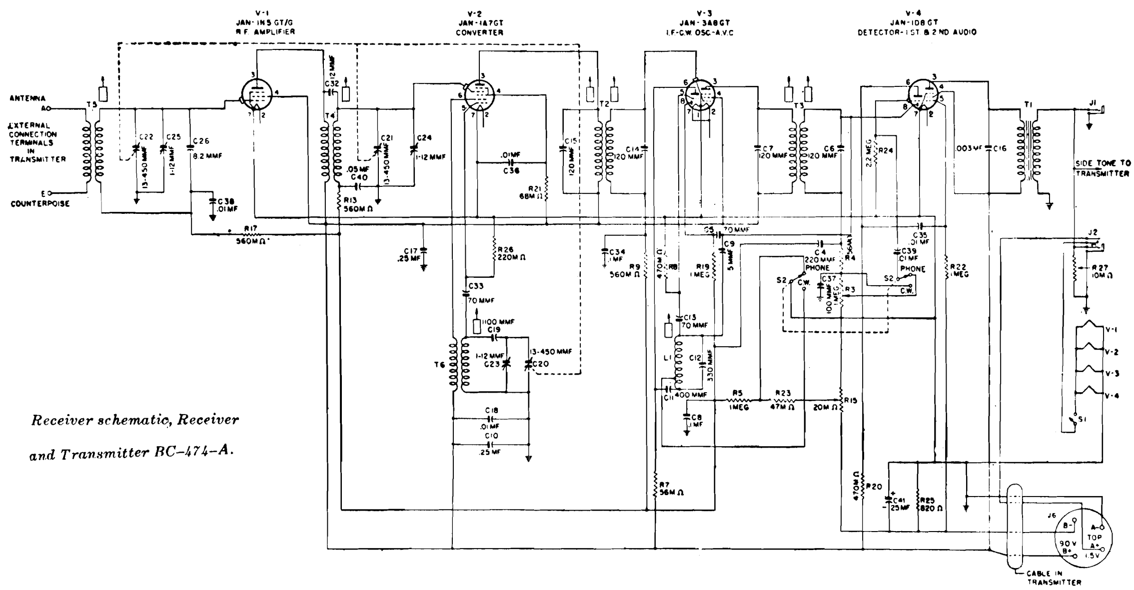
BC-438

The BC-438 is a heterodyne frequency meter with a range from 195-215 mc. It uses a crystal at 4. 1 mc to provide a 20. 5 mc standard frequency (205 mc tenth harmonic) and a variable 19. 5 - 21. 5 mc oscillator to zero beat the unknown signal for measurement (again using the tenth harmonic of the oscillator) or for providing a signal for receiver adjustments.

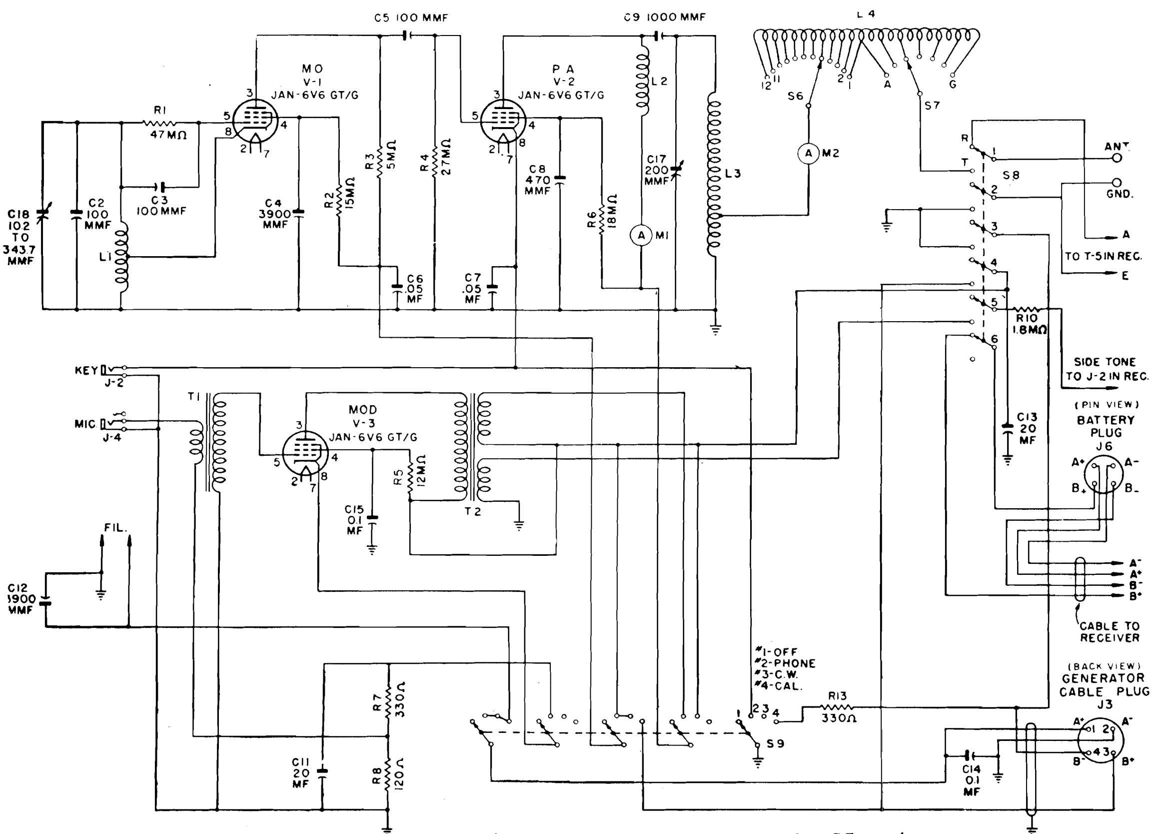


The BC-474-A is a portable AM radio transmitter-receiver covering the frequency range of 2.3 to 6.5 mc. It is capable of operation on both CW and voice. Power is supplied by a 90 volt dry cell and a 1.5 volt dry cell, or a hand generator, GN-44-A for the transmitter. Transmitter output is rated at 4 watts. A 35 foot antenna and a 35 foot counterpoise are required for proper output and operation.

The receiver is a superheterodyne with an IF of 455 kc. The input is to an RF stage and the output to one or two pairs of high impedance headsets. The transmitter is VFO'd and uses a separate power amplifier for the output stage. The power amplifier is keyed for CW operation.



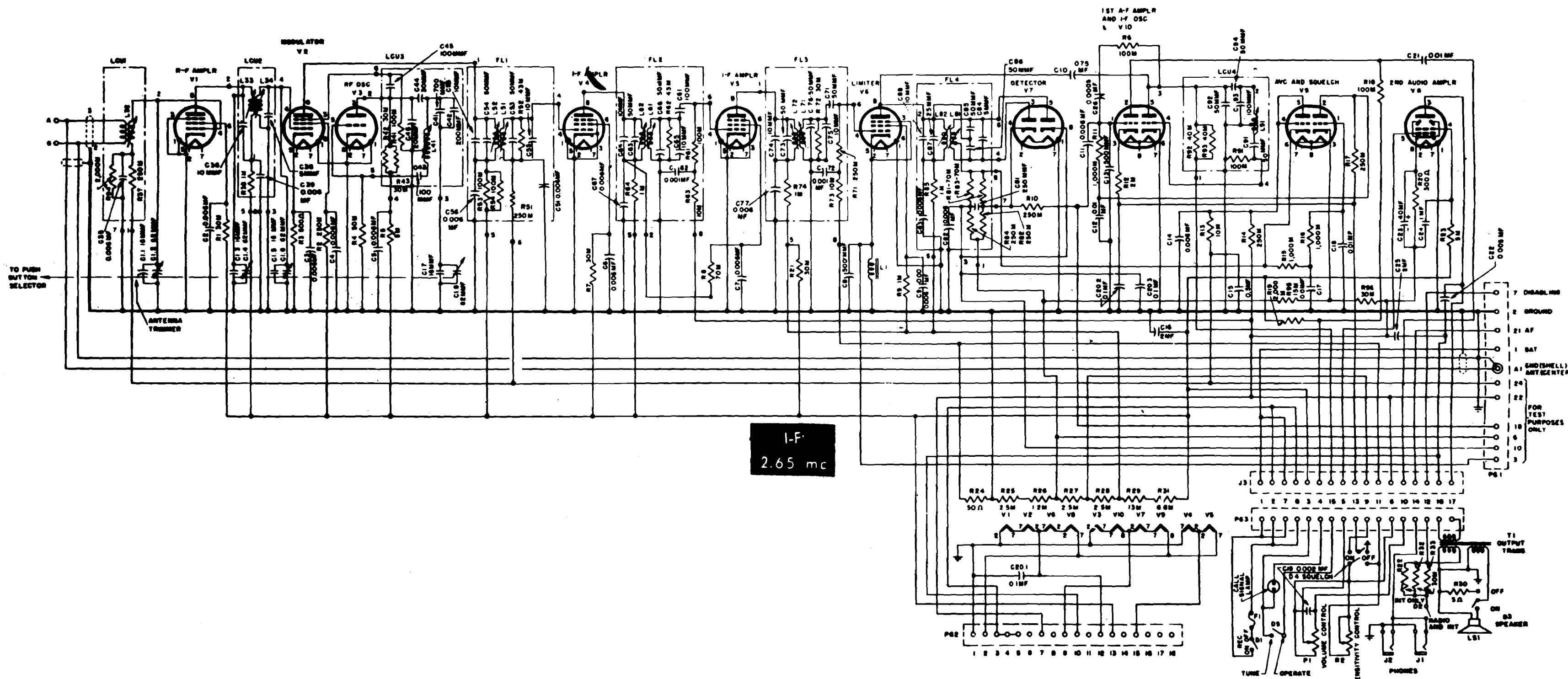
Receiver schematic, Receiver and Transmitter BC-474-A.



Transmitter schematic, Receiver and Transmitter BC-474-A.

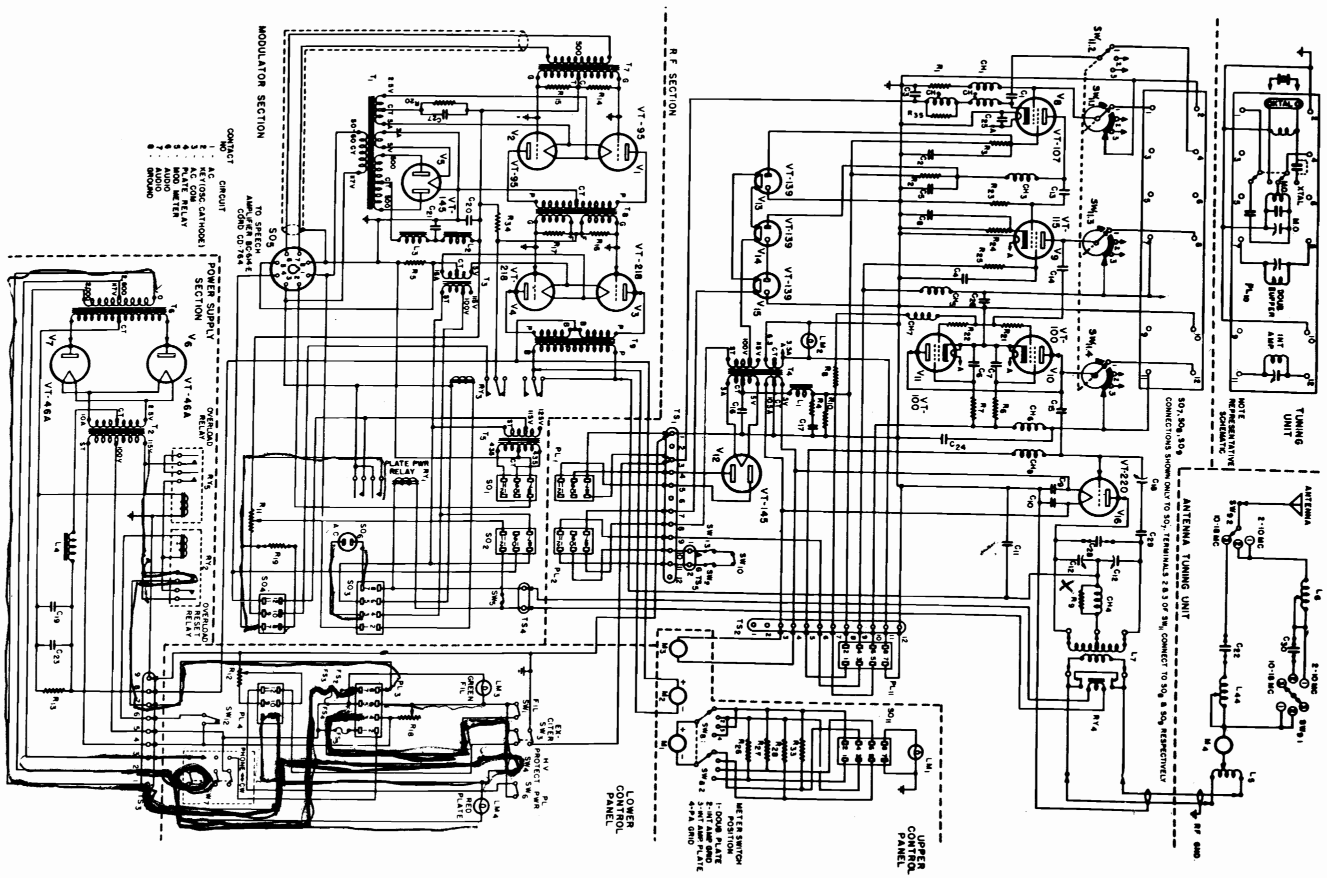
BC-603

The BC-603 receiver is an FM unit covering the range 20.0-29.7 mc. It is the companion unit to the BC-604 transmitter. This receiver is a high sensitivity unit with an IF of 2.65 mc. For complete conversion data, see CQ, September 1958, P. 74.



BC-610

While it is possible to use the BC-610 with the tuning boxes, the stability resulting is not consistent with current amateur standards and will probably lead to considerable correspondence with FCC monitoring stations plus rapidly deteriorating neighbor relations due to TVI, BCI, HAI, EOI, etc. Ad Nauseum. 4 screws remove the tuning box assembly. It is a simple matter to drive the transmitter with a low power VFO by mounting a SO-239 connector on the exciter deck and driving the 807 buffer-multiplier. If a higher power exciter is available, the 250th final may be driven directly. Don't rejoice yet. The TVI is still there.

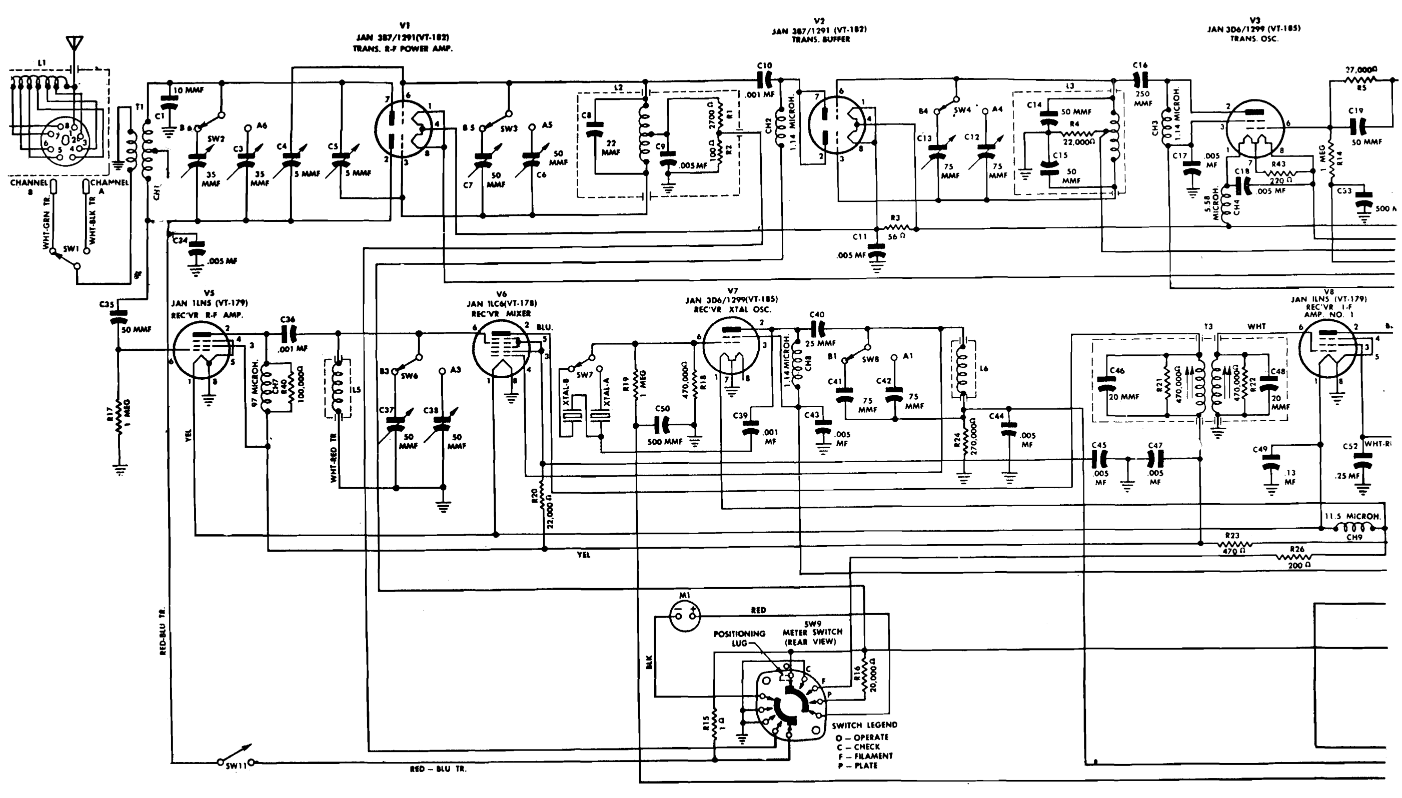


BC-620

The BC-620 is a low power, frequency modulated transmitter-receiver unit, covering the frequency range of 20 to 27.9 mc. It operates on two preset crystal controlled frequencies, which are selected by a front panel switch. It is designed to operate from batteries or a six or twelve volt power supply system. It was originally intended for mobile or portable use.

The receiver is a superheterodyne with a 2.88 mc intermediate frequency. The receiver local oscillator is crystal controlled. The transmitter operates with a VFO. The VFO is held on the proper frequency by a reactance tube which is in turn operated by receiving a small portion of the transmitted frequency, and correcting the VFO to IF.

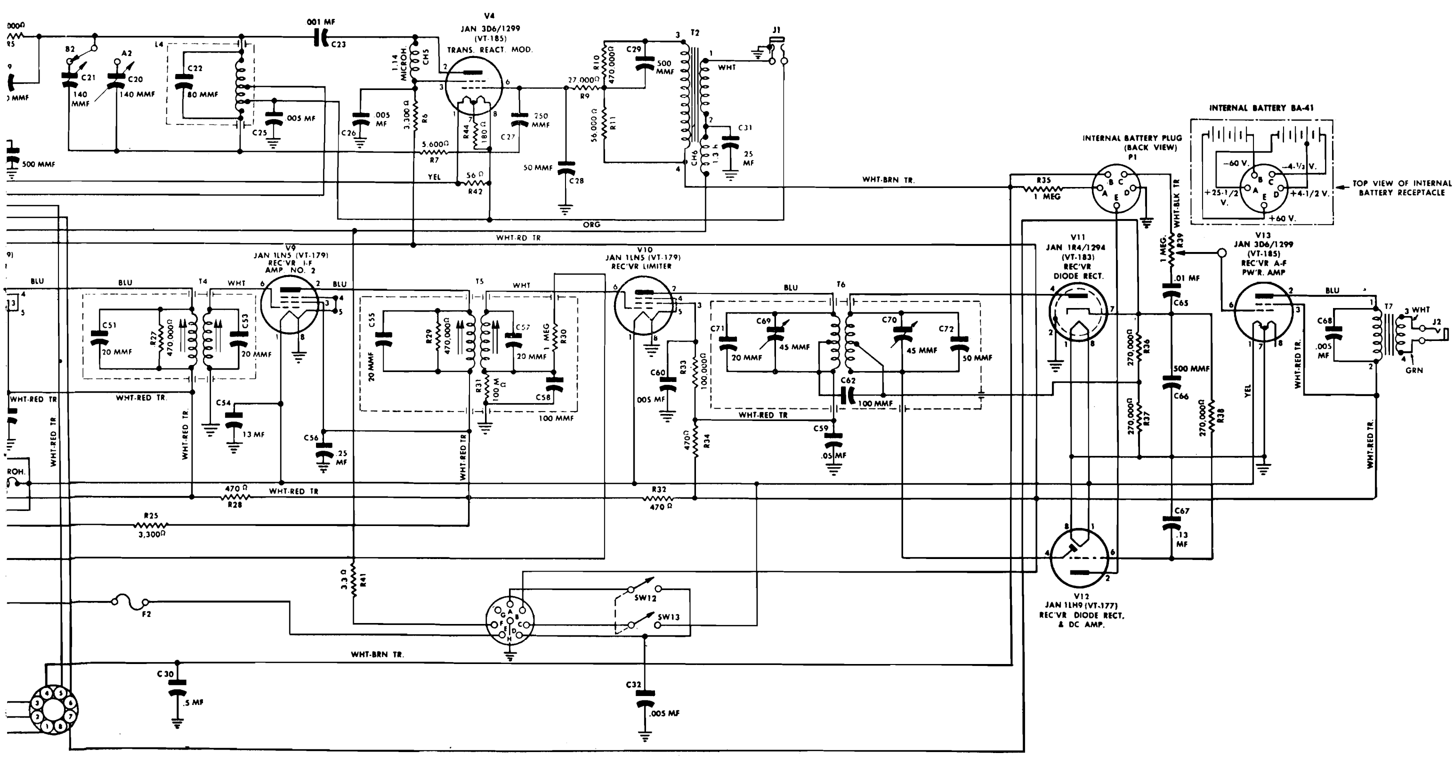
Transmitter power output is approximately one watt. The receiver uses crystals in the frequency range of 5.7067 mc to 8.340 mc. The power requirements of the BC-620 are as follows:



FUNCTION	Battery	Battery No.	Volts	Amperes
Receive	Rec "A"	BA-40*	1.5	0.7
Receive	Rec "B"	BA-40*	90.0	0.025
Trans.	Rec "A"	BA-39&BA-40*	1.5	0.7
Trans.	Rec "G"	BA-39&BA-40*	90.0	0.045
Trans.	TR. "A"	BA-39&BA-40*	7.5	0.300
Trans.	TR. "B"	BA-39&BA-40*	150.0	0.045

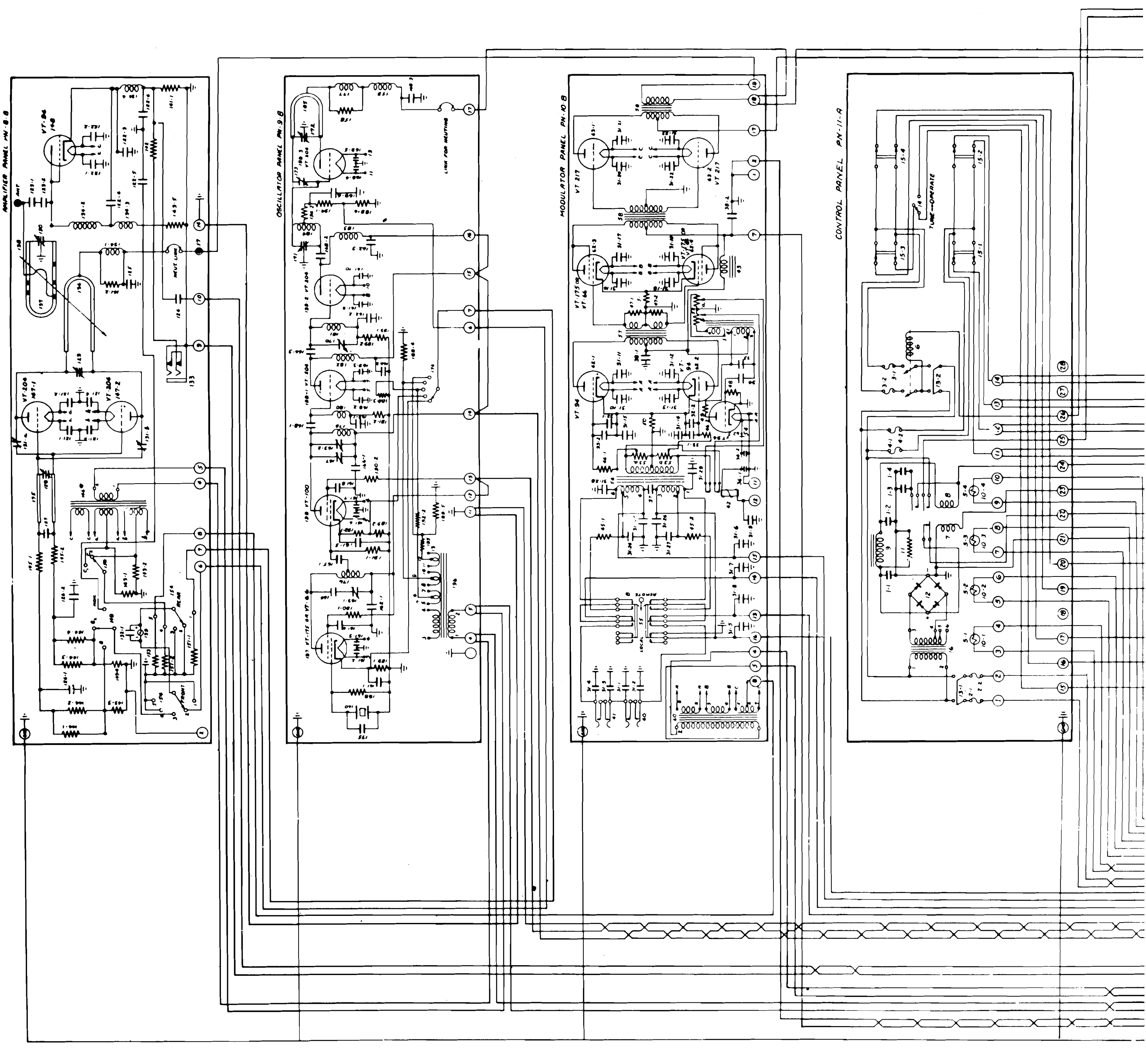
*BA-39 and BA-40 are multi-voltage batteries.

Note: Red dots on the trimmer shafts indicate the side of the slot that should be towards the dial card. The width of the slot is about one-tenth division. In case the red dot has worn off, its proper position can be found by fully meshing the capacitor. The end of the slot near the 0 of the 0-6 scale is the end that should carry the red dot.



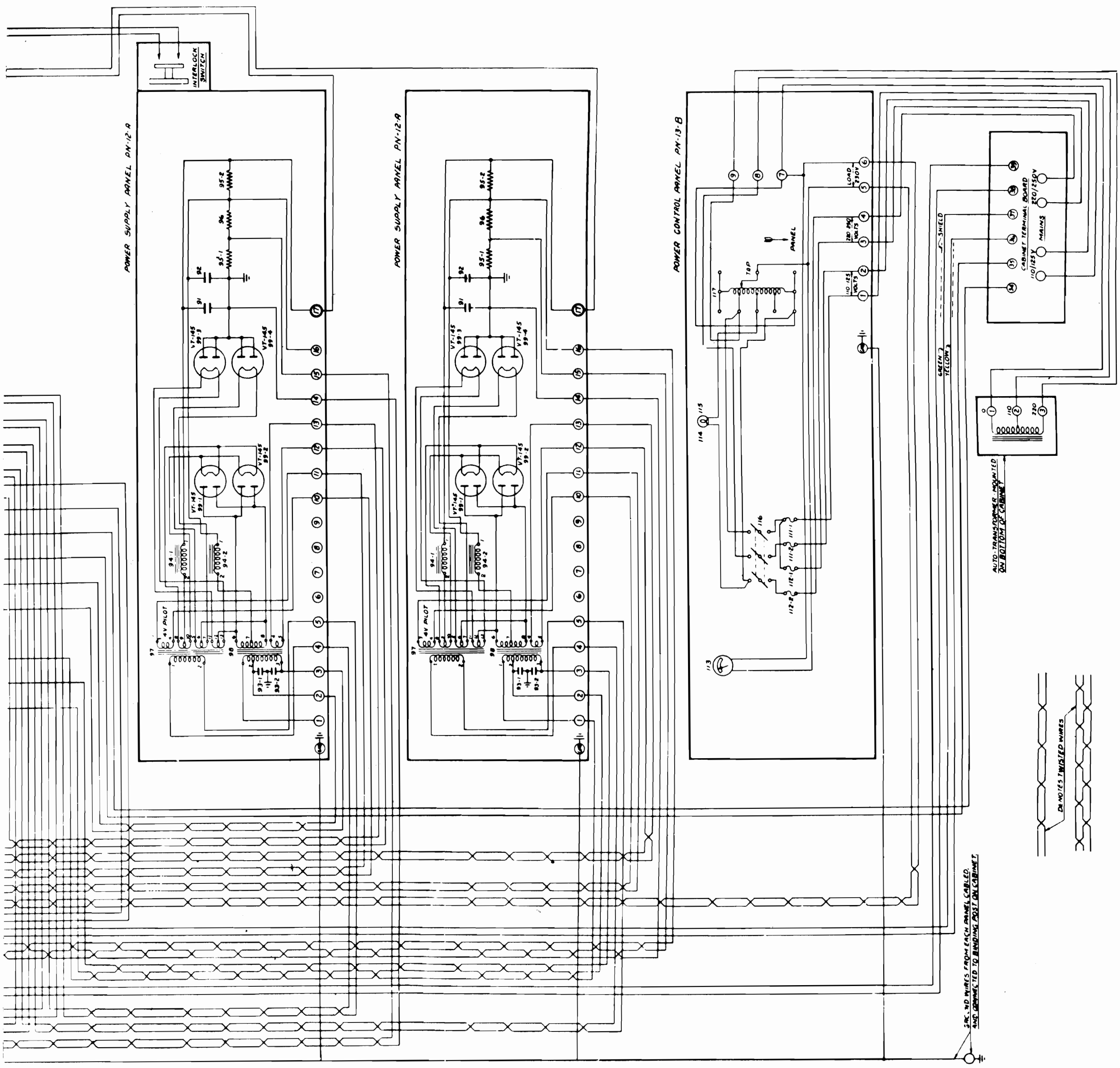
BC-640

The BC-640 is a ground type, rack-mounted transmitter for the 100 to 156 mc band for general communications with aircraft. It is amplitude modulated, providing 50 watts output over the band. Provision is made for the use of tone modulation when MCW operation is necessary. Operation is crystal controlled, with frequency changing being accomplished by changing the crystal and the circuits. Crystals used are in the 5555. 5 to 8666. 6 mc range, for a total



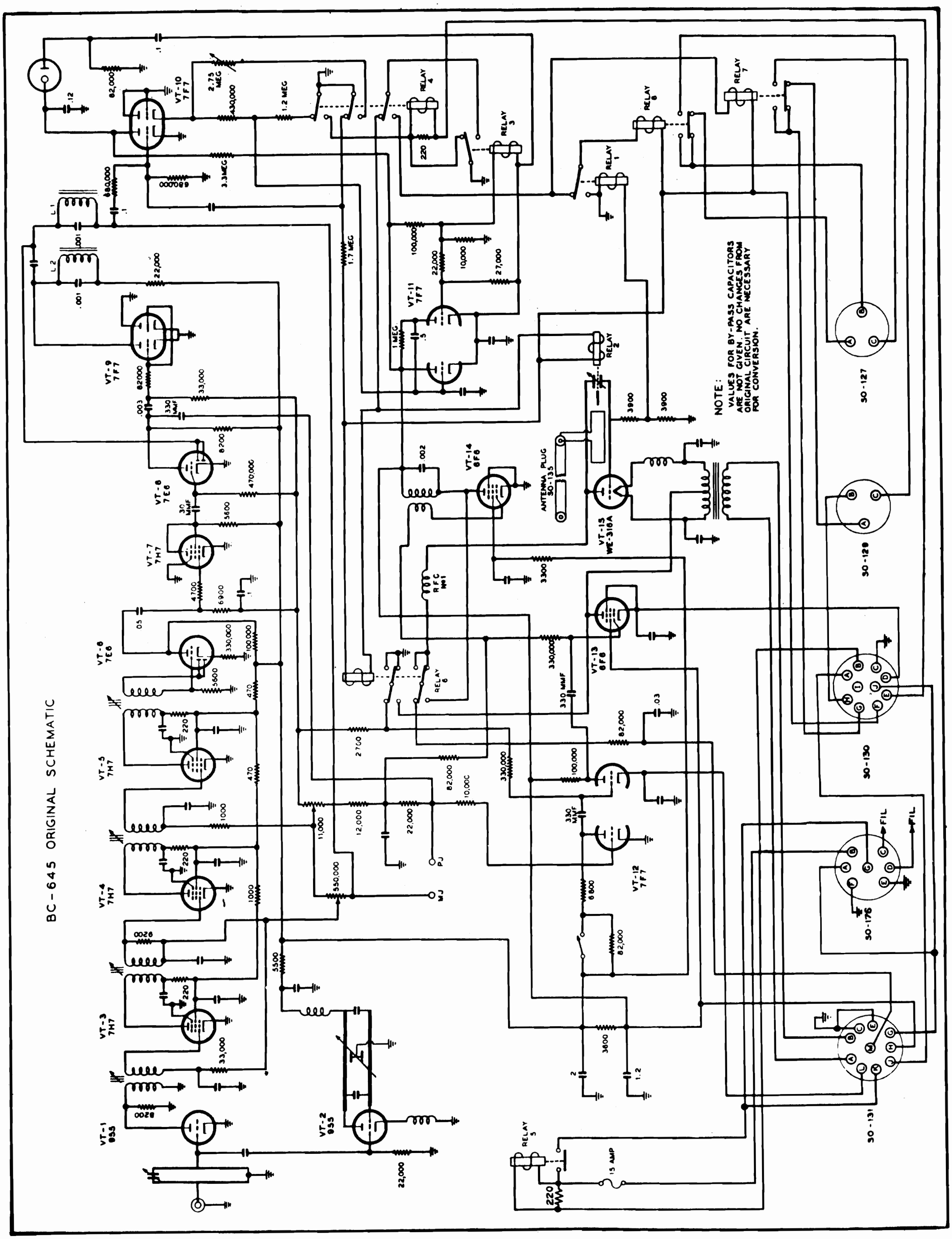
multiplication of 18 times. Various sections make up the complete transmitter and each is individually removable for repairs. Input power is 110/220 volts 60 cycles single phase. Minor differences exist between various models such as the addition of dial locks, and the reduction in the number of meters employed in the BC-640(B)

This is the biggest, most powerful TVI generator ever built, and with slight modification will be able to completely blank out all vhf and uhf channels for miles around. This gives TVI even when turned off.



BC-645

The BC-645 is an airborne IFF transceiver for 470-495 mc and transmitted either a pulse or modulated CW signal (30 kc). This unit can be converted for 420 mc ham use, rather easily. For conversion details, see CQ, December, 1956, P. 66.

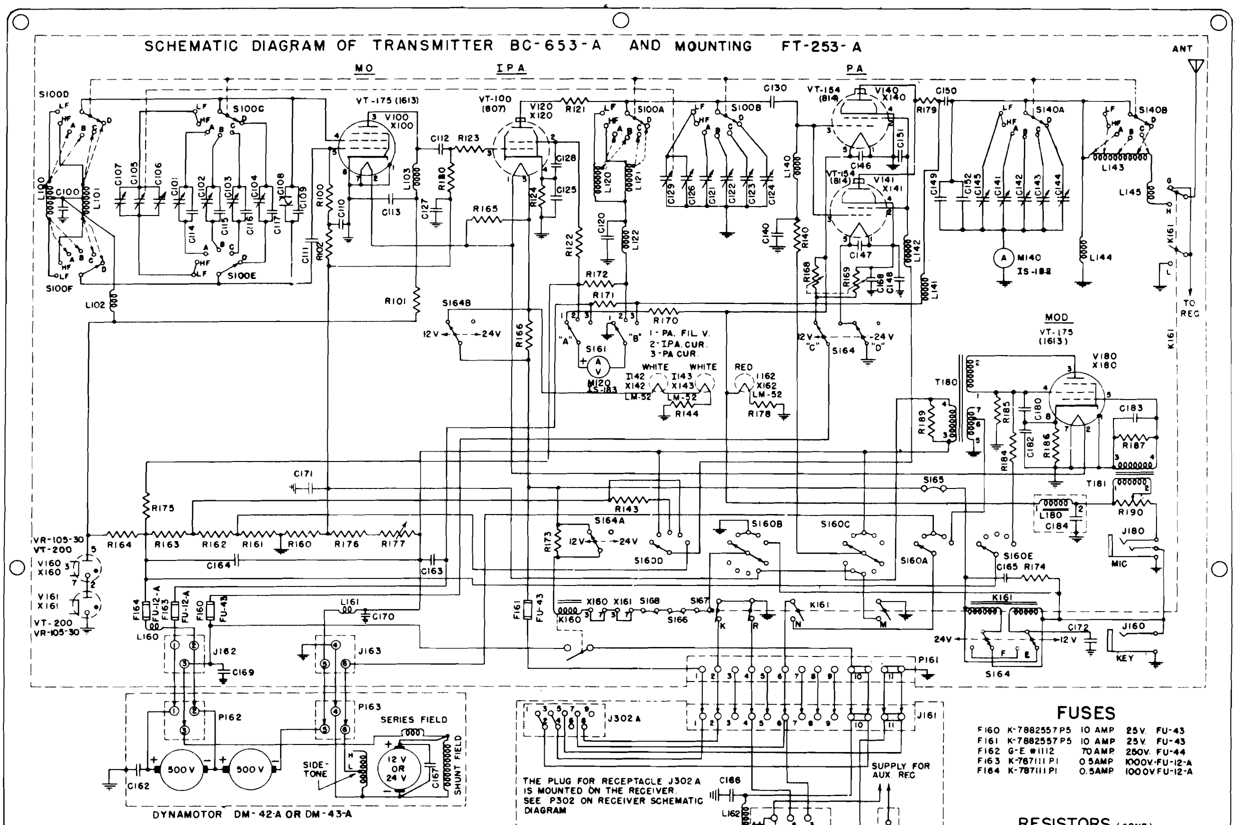


BC-645 ORIGINAL SCHEMATIC

The BC-653 is a vehicular transmitter receiver operating from either 12 or 24v dc. On 12 volts the battery drain is 42 amperes while on 24 volts the drain is 30 amperes. Transmitter output is over the range of 2 to 4.5 mc at a cw power of 50 to 90 watts. Voice power output (AM) is approximately 1/4 of this.

The receiver is the BC-652A and covers the range in two bands. The transmitter is the BC-653A. The antenna uses mast sections MS-49 to MS-53 inclusive and a base MP-37. A T-17 microphone is used for voice. A 200 kc crystal oscillator is built into this equipment to calibrate the transmitter. The receiver uses a 915 kc if.

This is 400 lbs of nothing. Actually, it works pretty well but takes the patience of Job to sort out the millions of tuning units.



CAPACITORS

C 100	.0002 MFD	1000 V
C 101	MIN.45; 280 MMFD SWING	1750 V
C 102	MIN.45; 280 MMFD SWING	1750 V
C 103	MIN.45; 280 MMFD SWING	1750 V
C 104	MIN.45; 280 MMFD SWING	1750 V
C 105	280 MMFD SWING	1750 V
C 106	MIN.6-9 40-45 MMFD	1750 V
C 107	MIN.4-6 24-28 MMFD	1750 V
C 108	28 MMFD K-7890705	1000 V
C 109	70 MMFD	250 V
C 110	.005 MFD	600 V
C 111	.0005 MFD	5000 V
C 112	.002 MFD	1000 V
C 113	.005 MFD	1000 V
C 114	25 MMFD	500 V
C 115	25 MMFD	500 V
C 116	25 MMFD	500 V
C 117	25 MMFD	500 V
C 120	.005 MFD	1000 V
C 121	MIN.25; 180 MMFD SWING	1500 V
C 122	MIN.25; 180 MMFD SWING	1500 V
C 123	MIN.25; 180 MMFD SWING	1500 V
C 124	MIN.25; 180 MMFD SWING	1500 V
C 125	.005 MFD	1000 V
C 126	MIN.5; 8 MMFD SWING	2500 V
C 127	.005 MFD	1000 V

CAPACITORS (CONT.)

C128	.005 MFD	1000 V
C129	100 MMFD SWING	1750 V
C130	40 MMFD	1000 V
C140	.0005 MFD	2500 V
C141	MIN. 33; 435 MMFD SWING	1500 V
C142	MIN. 33; 435 MMFD SWING	1500 V
C143	MIN. 33; 435 MMFD SWING	1500 V
C144	MIN. 33; 435 MMFD SWING	1500 V
C145	MIN. 33; 435 MMFD SWING	1500 V
C146	.005 MFD	600 V
C147	.005 MFD	600 V
C148	.005 MFD	1000 V
C149	45 MMFD K-7690180	1000 V
C150	.005 MFD	5000 V
C151	.005 MFD	5000 V
C152	45 MMFD K-7890180	1000 V
C162	.015 MFD	5000 V
C163	1.0 MFD	2400 V
C164	1.0 MFD	2400 V
C165	1.0 MFD	600 V
C166	25 MFD	50 V
C167	25 MFD	50 V
C168	.02 MFD	1000 V
C169	.025 MFD	800 V
C170	.05 MFD	600 V
C171	.05 MFD	600 V
C172	.005 MFD	600 V

CAPACITORS (CONT.)

C173	.10 MFD	1200 V
C180	1.0 MFD	1000 V
C182	25 MFD	50 V
C183	.0001 MFD	1000 V
C184	25 MFD	50 V

(VOLTAGE RATINGS ARE D.C. TEST VOLTAGE)

LIGHTS

I142	MAZDA # 47, 6.3V, .15A	LM-52
I143	MAZDA # 47, 6.3V, .15A	LM-52
I162	MAZDA # 47, 6.3V, .15A	LM-52

METERS

M120	15 V. D-C; 3800 OHMS.	IS-183
M140	6A. R-F	IS-182

RESISTORS

R 100	22000 OHMS	2 WATT
R 101	8000 OHMS	4 WATT
R 102	4700 OHMS	1 WATT
R 120	22000 OHMS	2 WATT
R 121	5 OHMS	5 WATT
R 122	22000 OHMS	2 WATT
R 123	5 OHMS	5 WATT
R 124	390 OHMS	2 WATT
R 140	4000 OHMS	4 WATT
R 143	56000 OHMS	2 WATT
R 144	15 OHMS	0.5 WATT
R 160	2500 OHMS	25 WATT
R 161	5000 OHMS	25 WATT
R 162	3150 OHMS	25 WATT
R 163	3150 OHMS	25 WATT
R 164	5000 OHMS	25 WATT
R 165	15 OHMS	8 WATT

FUSES

F160	K-7882557 P5	10 AMP	25V.	FU-43
F161	K-7882557 P5	10 AMP	25V.	FU-43
F162	G-E #1112	70 AMP.	250V.	FU-44
F163	K-767111 P1	0.5 AMP	1000V.	FU-12-A
F164	K-787111 P1	0.5 AMP.	1000V.	FU-12-A

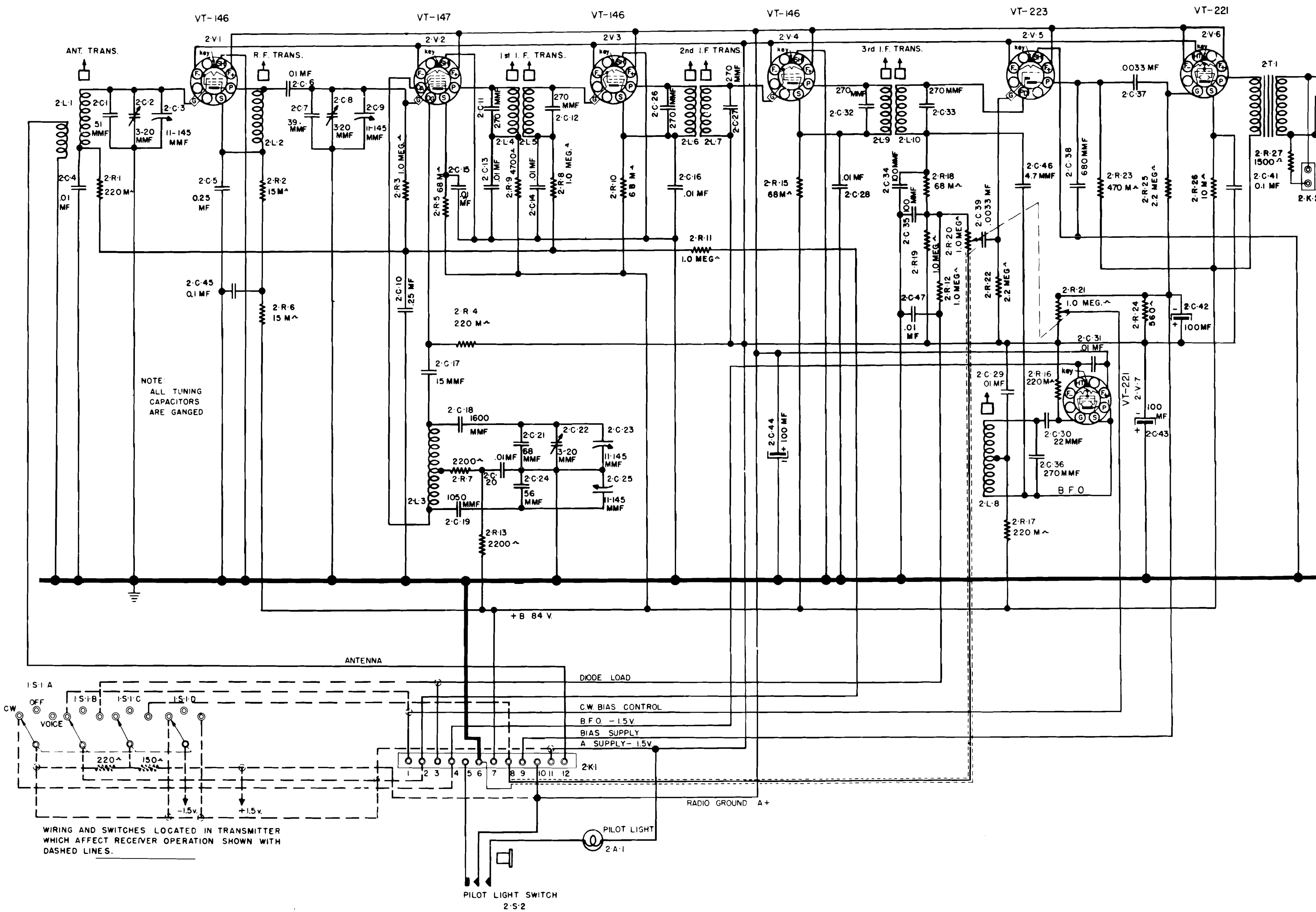
RESISTORS (CONT.)

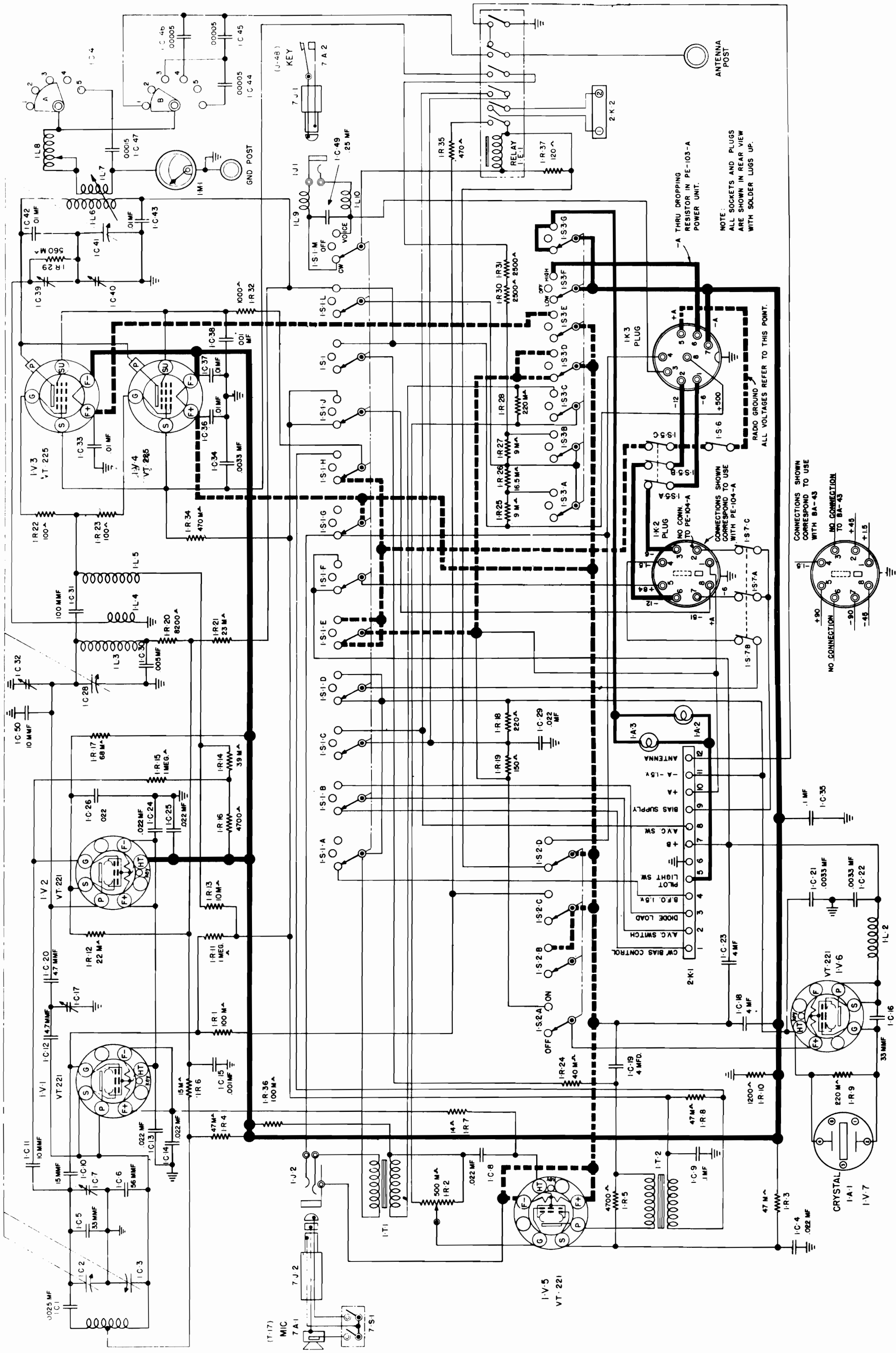
R 166	7 OHMS	20 WATT
R 168	1.3 OHMS	4.2 A
R 169	1.3 OHMS	4.2 A
R 170	2400 OHMS	1 WATT
R 171	25 OHMS	8 WATT
R 172	160 OHMS	1 WATT
R 173	16 OHMS	20 WATT
R 174	4.7 OHMS	1 WATT
R 175	6000 OHMS	20 WATT
R 176	160 OHMS	35 WATT
R 177	225 OHMS	4 A.
R 178	39 OHMS	2 WATT
R 179	5 OHMS	5 WATT
R 184	2000 OHMS	20 WATT
R 185	18000 OHMS	12 WATT
R 186	430 OHMS	2 WATT
R 187	330000 OHMS	0.5 WATT
R 189	7500 OHMS	2 WATT
R 190	200 OHMS	.14 A

TUBES

V 100	GL-1613	VT-175
V 120	GL-807	VT-100
V 140	GL-814	VT-154
V 141	GL-814	VT-154
V 160	VR-105-30	VT-200
V 161	VR-105-30	VT-200
V 180	GL-1613	VT-175

SCR-284 (BC-654A) 3800-5800 kc transmitter-receiver, CW or AM, 17 watts. 455 kc IF.
Uses PE-103A and vibrator supply for mobile use, 6 or 12 vdc.

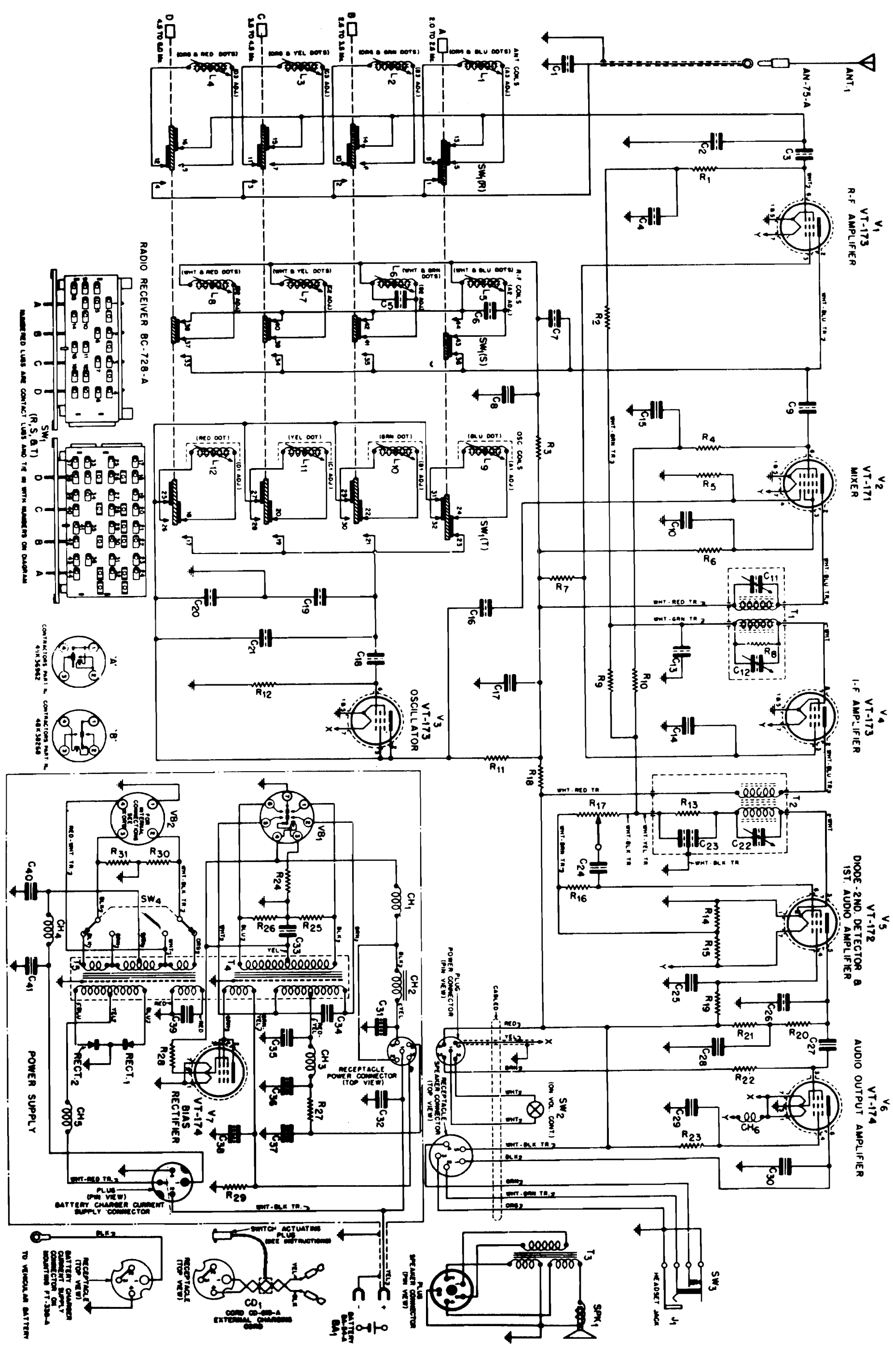



ANTENNA POST
GND POST
RELAY 1E-1
KEY 7A2 (J-48)
MIC 7A1 (T-17)
—A THRU DROPPING RESISTOR IN PE-103-A POWER UNIT.
NOTE: ALL SOCKETS AND PLUGS ARE SHOWN IN REAR VIEW WITH SOLDER LUGS UP.
RADIO GROUND ALL VOLTAGES REFER TO THIS POINT.
CONNECTIONS SHOWN CORRESPOND TO USE WITH PE-104-A
CONNECTIONS SHOWN CORRESPOND TO USE WITH BA-43
NO CONNECTION TO BA-43
NO CONNECTION
CRYSTAL 1-A1 1-V-7
1-V-5 VT-221
1V3 VT 225
1V2 VT-221
1V1 VT-221
VT-221 1V6

This equipment is a six tube, push-button radio receiver designed for portable or vehicular operation. It is powered by a two volt storage battery, a BB-54-A. The power supply consists of a vibrator unit complete with a recharger for the storage cell. The BC-728-A operates over a range of 2 to 6 mc on four preset frequencies chosen by the operators selection of appropriate push buttons.

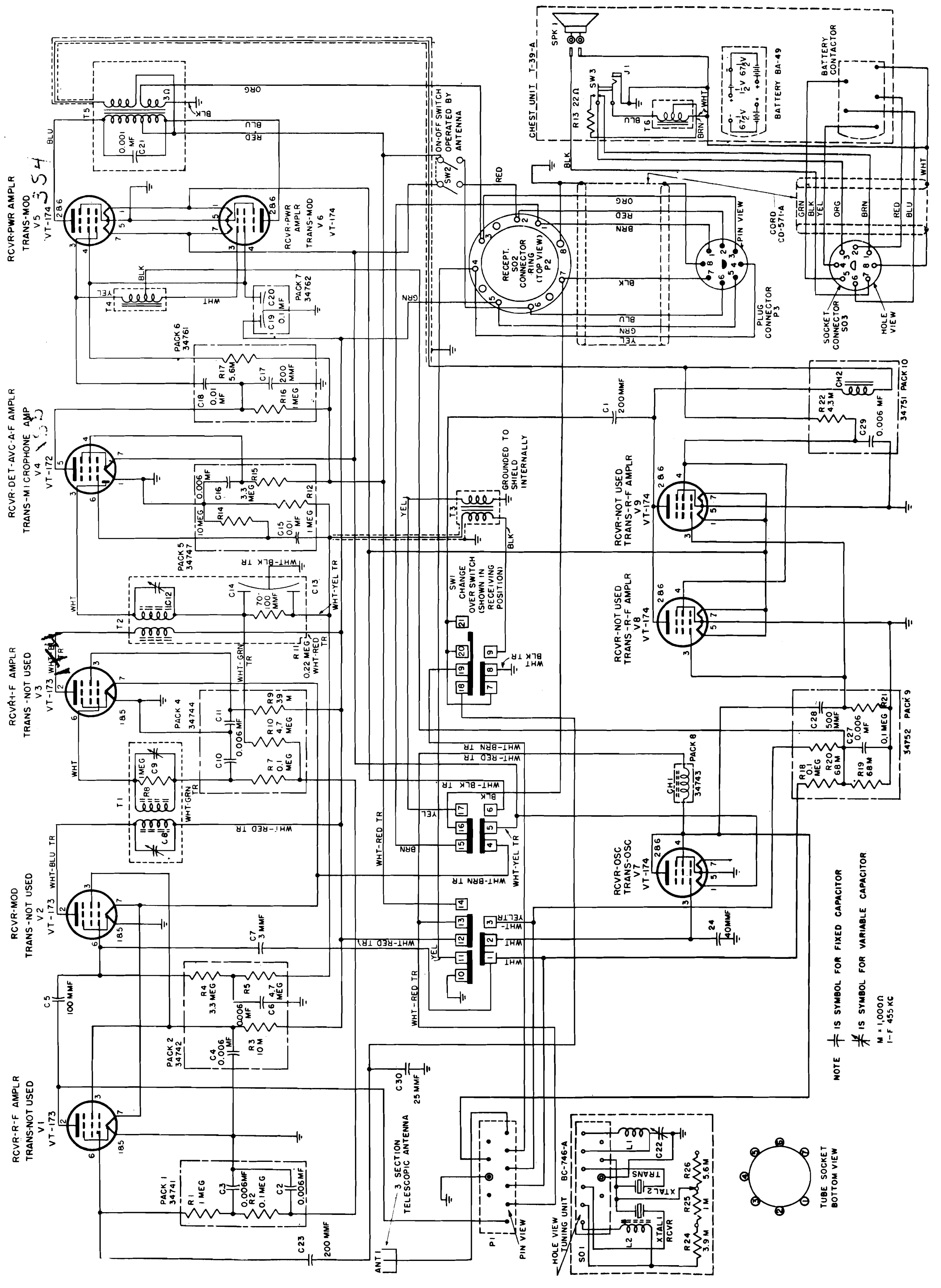
Button A has a possible range of 2. 0 to 2. 6 mc, button B covers 2. 6 to 3. 5 mc, button C covers 3. 5 to 4. 5 mc, and button D covers 4. 5 to 6 mc. The receiver operates with AM signals and has an intermediate frequency of 455 kc.

An external whip type antenna, AN-75-A is used with the equipment and a jack is provided for earphone operation when desired. A loudspeaker is normally used with this equipment, and it is mounted within the case of the BC-728-A.



BC-745

The BC-745, a small transmitter-receiver known as the "Horsey-Talky" covers 2-6 mc crystal controlled. The receiver has an IF at 455 kc, and the transmitter is grid modulated. Power under 1 watt. Power: Filament, 1.5 v, Plate, 67 volts receiver; 120 v transmitter

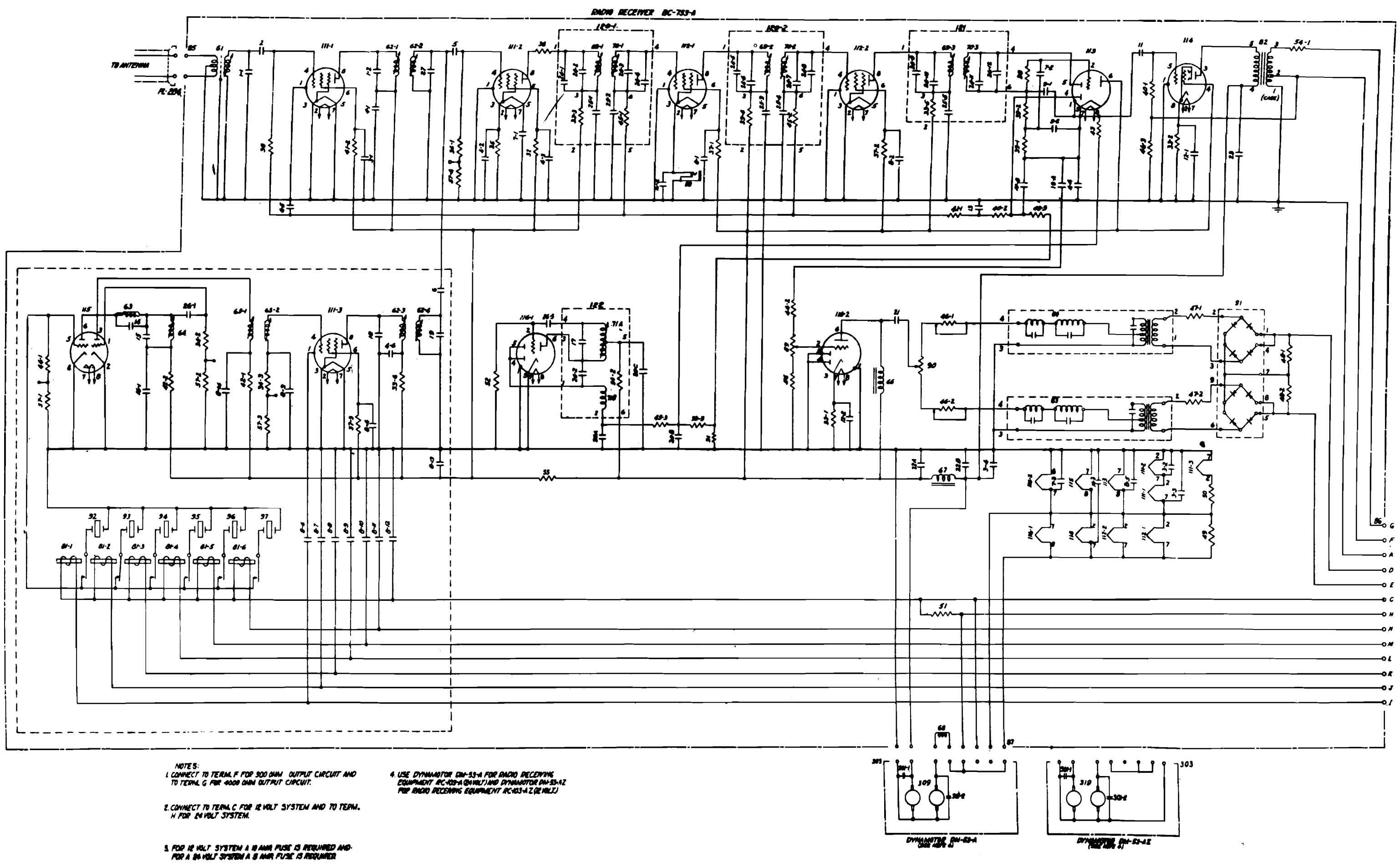


BC-733

The BC-733 is a crystal controlled receiver for aircraft navigational purposes. It operates in the 108. 3 to 110. 3 mc band and has a 6. 9 mc I. F. The input power is 12 or 24 volts.

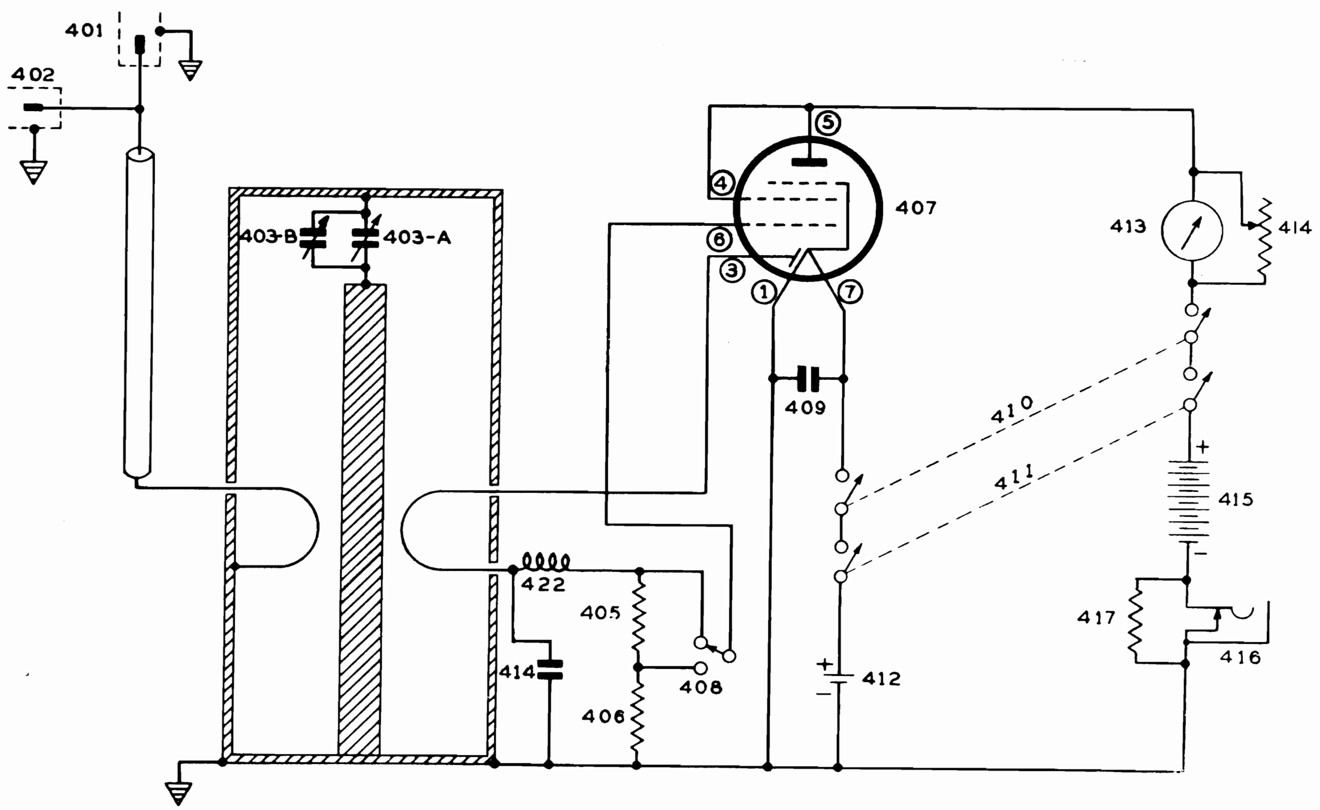
This converts easily to two meters. The 90 and 150 cycle filters can be used for many experimental purposes.

The BC-733 can also be converted to receive signals from U. S. space satellites on 108 mc.



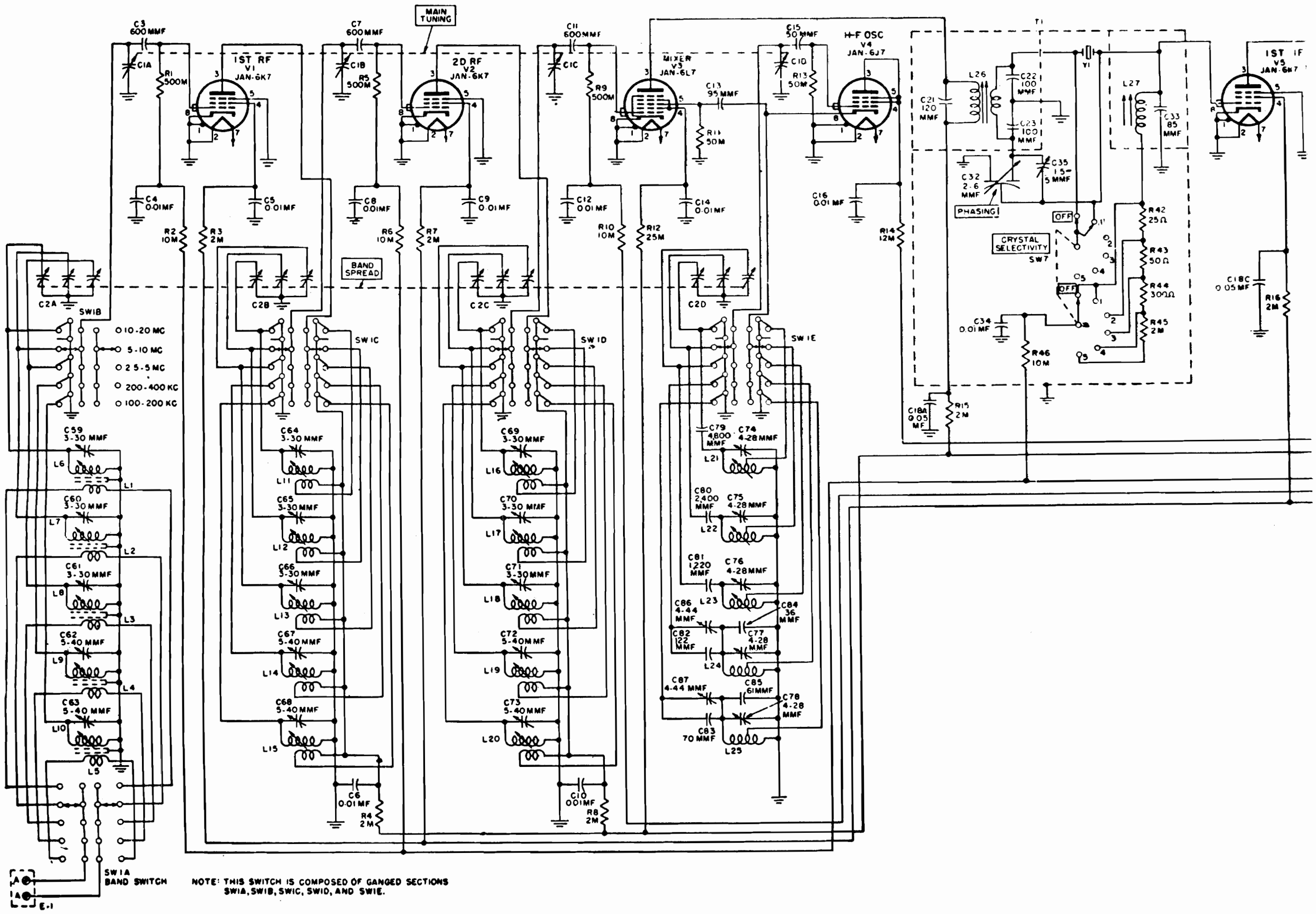
BC-906

The BC-906-C is a frequency meter of the absorbtion type. The BC-906 is housed in a metal case with a door to protect the dial, meter and switches, but which also serves as a housing for the calibration chart and the antenna. In use the antenna is plugged into the socket located through a hole at the top of the case. The sensitivity of the meter depends upon the length to which the antenna is extended and the antenna should be adjusted in length to maximum sensitivity. The frequency range of the BC-906 is 150 to 225 mc. The detection is accomplished by a diode section of a1S5, the pentode section of that tube acting as a meter amplifier. The required voltages are 1. 5 volts for the filament, and 45 volts for the plate supply.

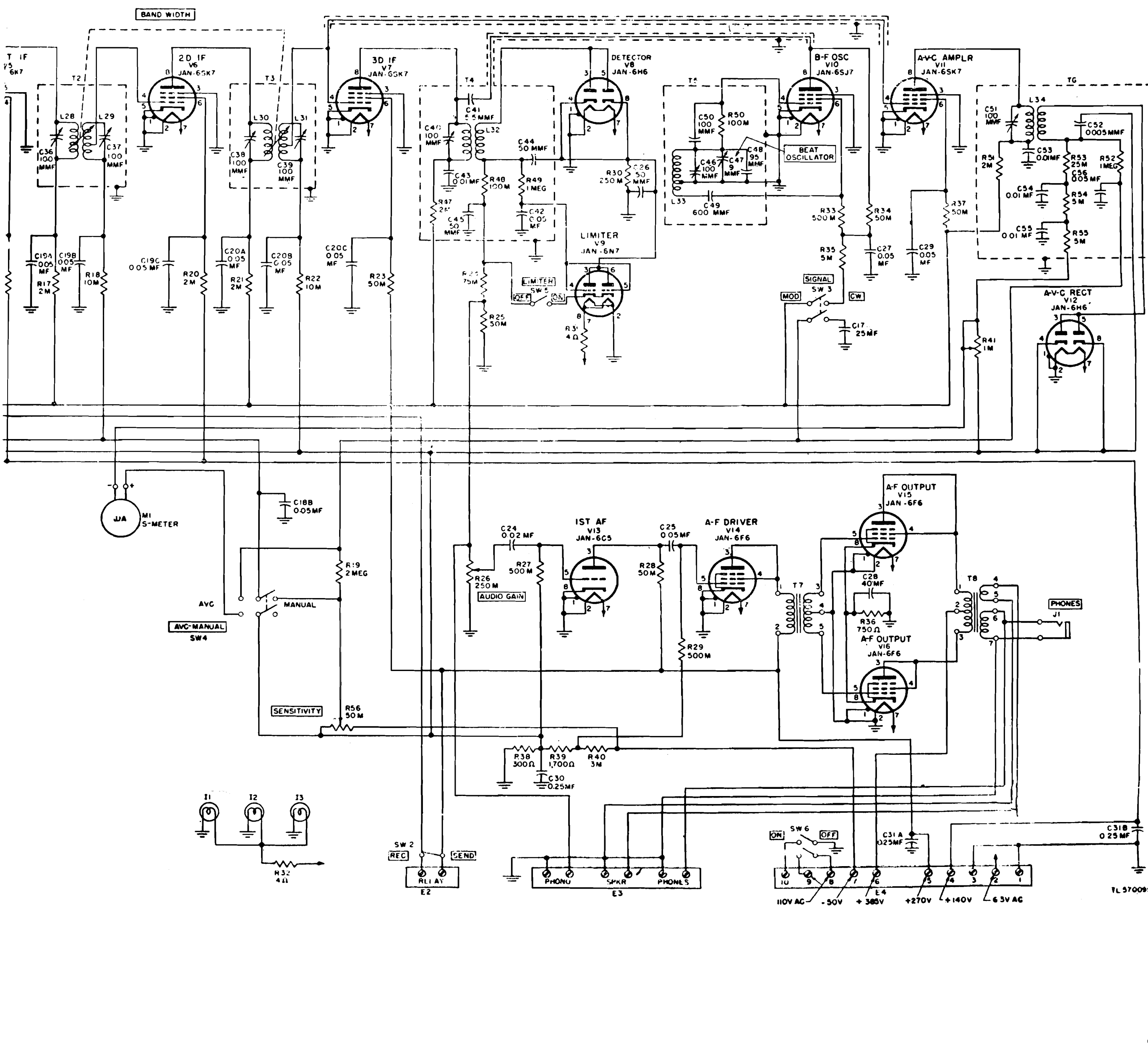


BC-779, 794, 1004

This is the military version of the Hammarlund Super-Pro. 455 kc IF. These receivers normally use a separate power supply, or may be battery operated .Six, 45 volt batteries are used, 5 for the plate, 1 for bias. The filament uses a 6 volt battery.

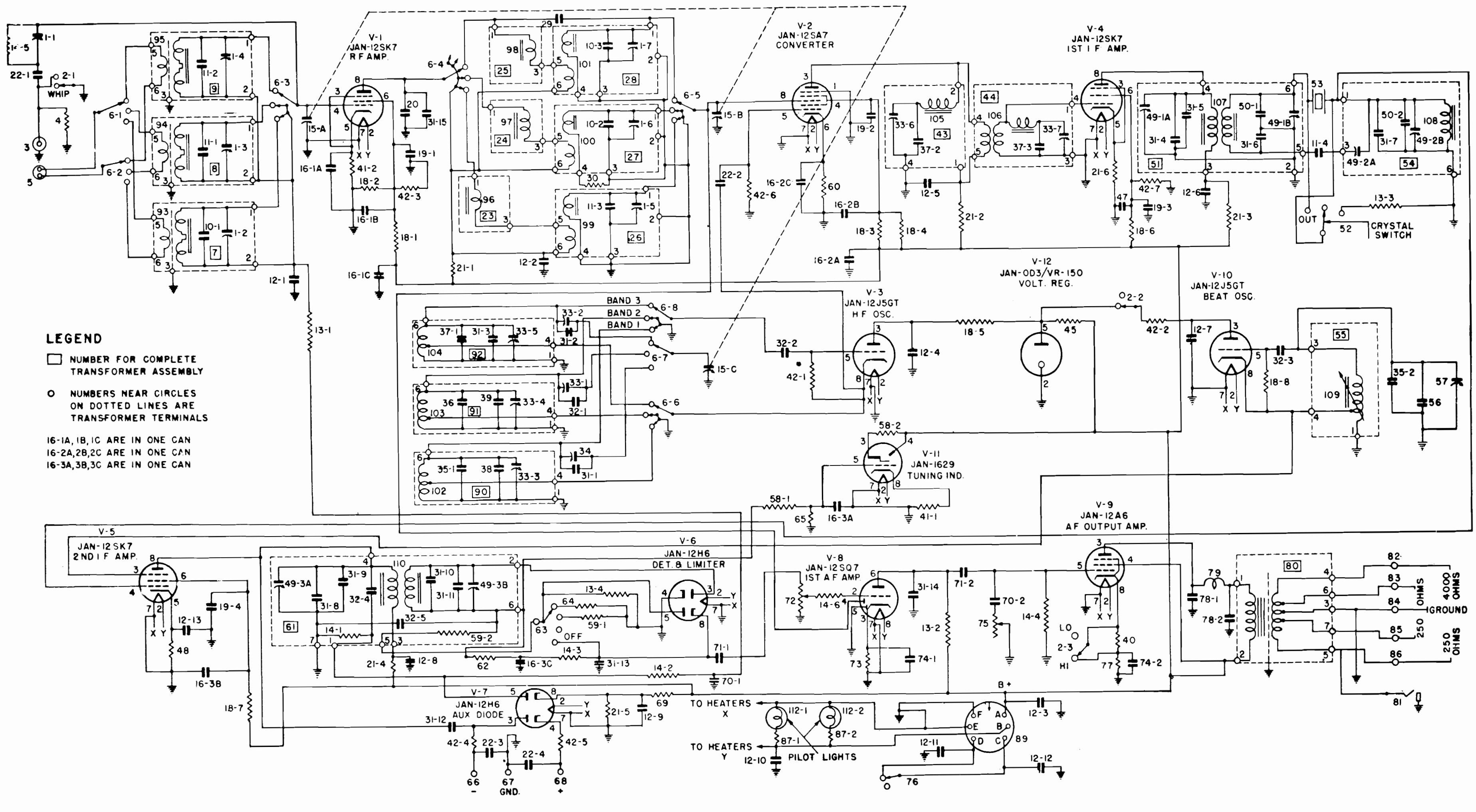


Model	Commercial Equivalent	Frequency Range
BC-779	SP-210-LX, SP-200-LX	0.1-0.4, 2.5-20 mc
BC-1004	SP-210-X, SP-200-X	0.54-20 mc



BC-969A

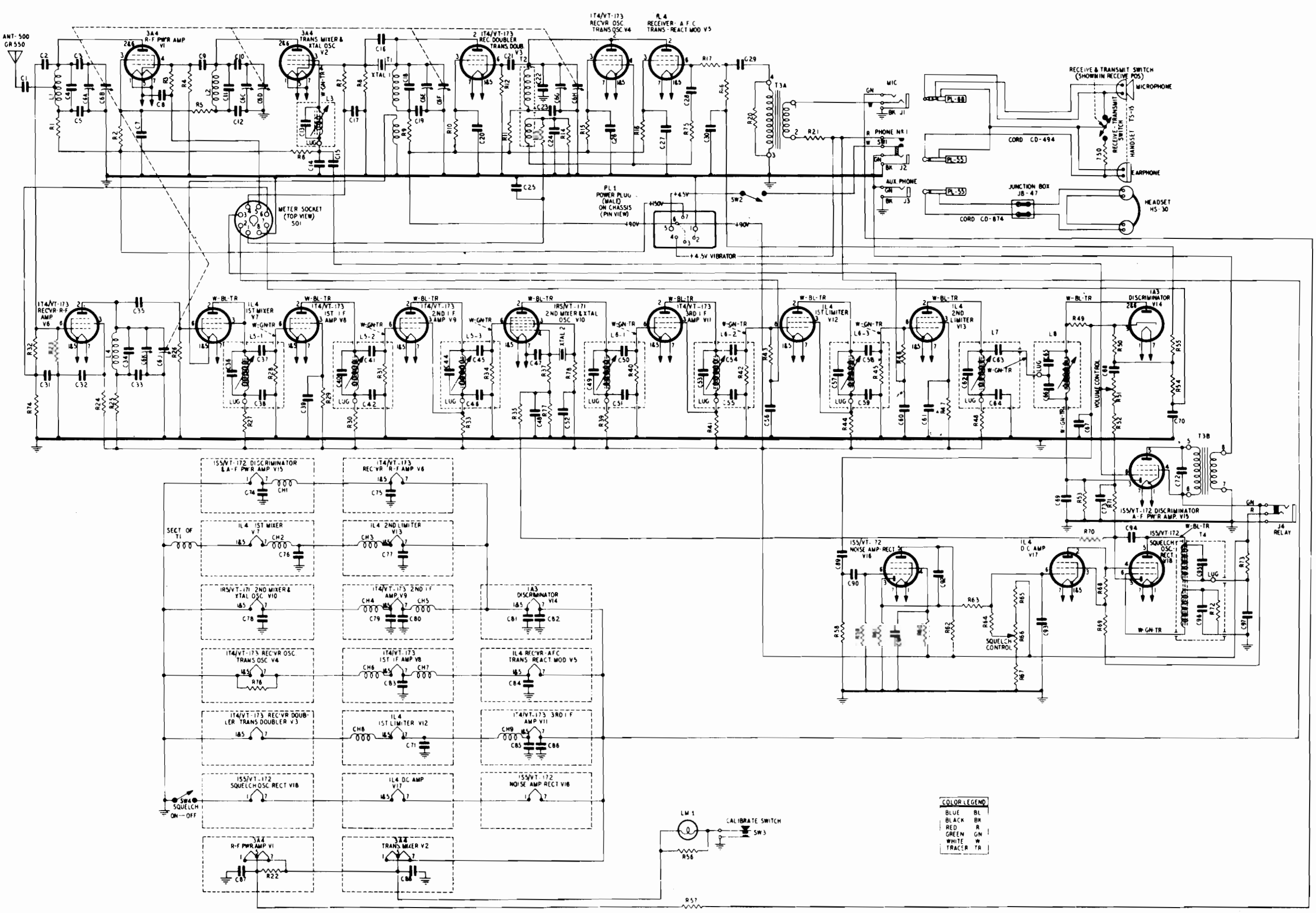
The BC-969A is a superheterodyne receiver covering the VLF band of 15 to 150 kc. The intermediate frequency is 455 kc. Power is supplied by an AR-61A supply or a PE-223. It may be operated on any power supply producing 12 volts at 2 amperes and 250 volts at 120 ma dc. The receiver employs a BFO, noise limiter, crystal filter, AVC and uses a VR tube for oscillator stability.



BC-1000

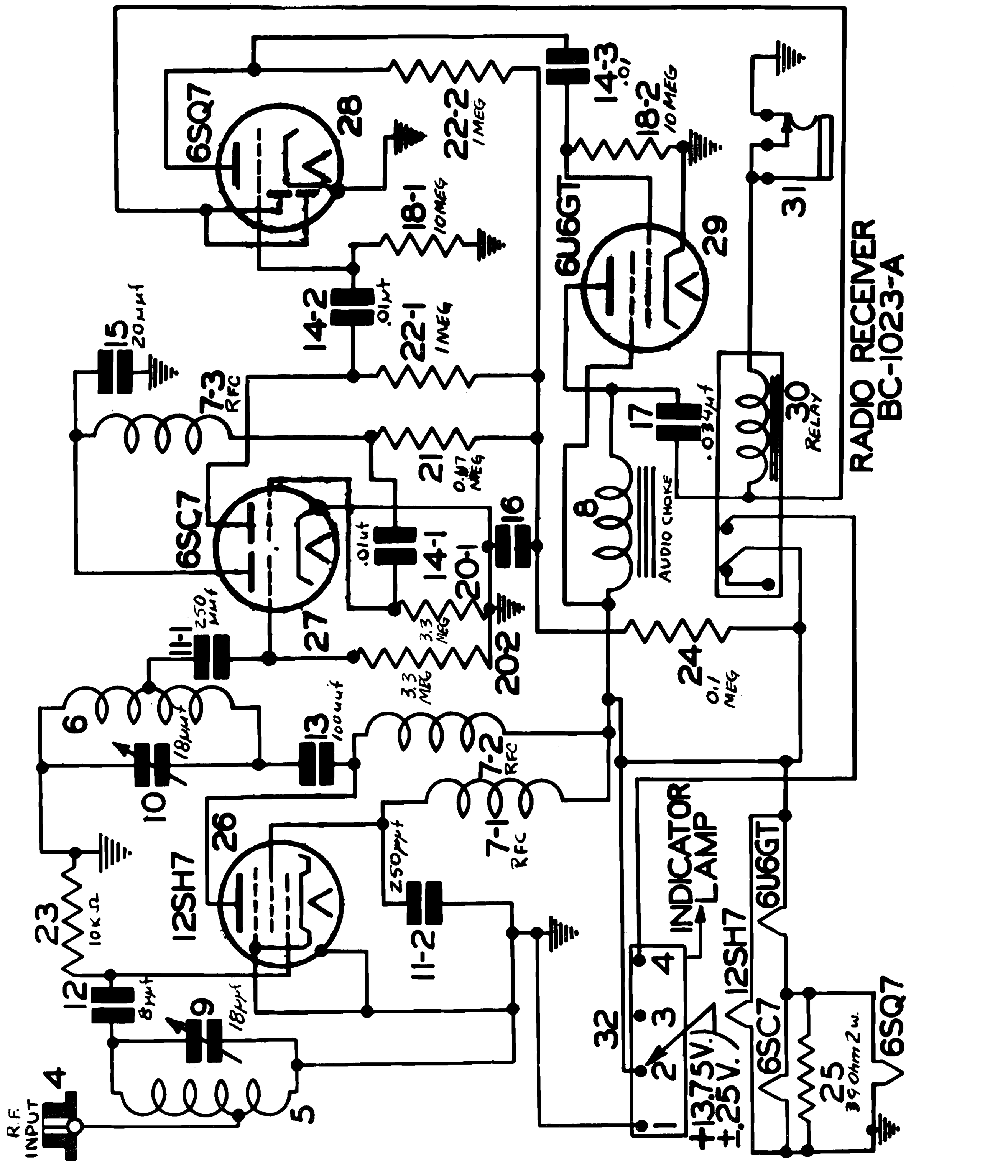
The SCR-300-A, whose major component is the receiver-transmitter BC-1000-A is a low power, battery operated set. It is primarily designed to be carried on the back of one man like a knapsack. It operates within the frequency range of 40.0 to 48.0 mc. The transmitter and receiver both tune to the same frequency simultaneously. The emission is FM and each transmit channel is 200 kc from the previous one, having been hand calibrated at the factory. Output is approximately one half watt to the antenna. Harmonics of a 4.3 mc crystal within the equipment are used for calibration points. The equipment employs squelch, AVC and AFC to maintain the transmitter on frequency. One special note is that during transmit periods the DIAL LIGHT AND CALIBRATE button should not be depressed. The IF frequency of the receiver is 4.3 mc for the first IF stages, and 2.5 mc for the second IF stages, the receiver being of the double conversion superheterodyne type.

Power requirements are 4.5 volts (filament) at 0.3 amperes and 90 volts plate supply at 25 ma. On transmit the requirements are 4.5 volts at 0.5 amperes, 90 volts plate supply at 25 ma, and 150 volts at 45 ma. Normally a 90 volt and a 60 volt battery are connected in series for the transmitter supply In operation a telephone headset or earphones and lip type microphone are used by the operator.



The BC-1023 is a VHF receiver covering the range of 62 to 80 mc. It is normally fixed tuned at 75 mc. Its purpose is to receive the 75 mc marker beacon signals used in aircraft landing systems, and to cause a light to operate when such a signal is received. The receiver has a simple RF amplifier followed by a grid leak detector and an audio amplifier. The audio signal is further detected and caused to operate a relay for control of the pilots' indicator. A phone jack is provided for signal monitoring.

Power requirements are 13.75 volts (nominal) at 1.05 amperes. The equipment operates without additional high voltage.



BC-1206

The BC-1206 receiver is a 200 to 400 kc superheterodyne using 28 volts on the filaments and plates. The output is to either low or high impedance headsets. The input is designed to operate on very short antennas such as are generally found in aircraft. The intermediate frequency is 135 kc. The entire receiver is designed for installation on the panel of a plane, the size being 4 by 4 by 6 5/8 inches.

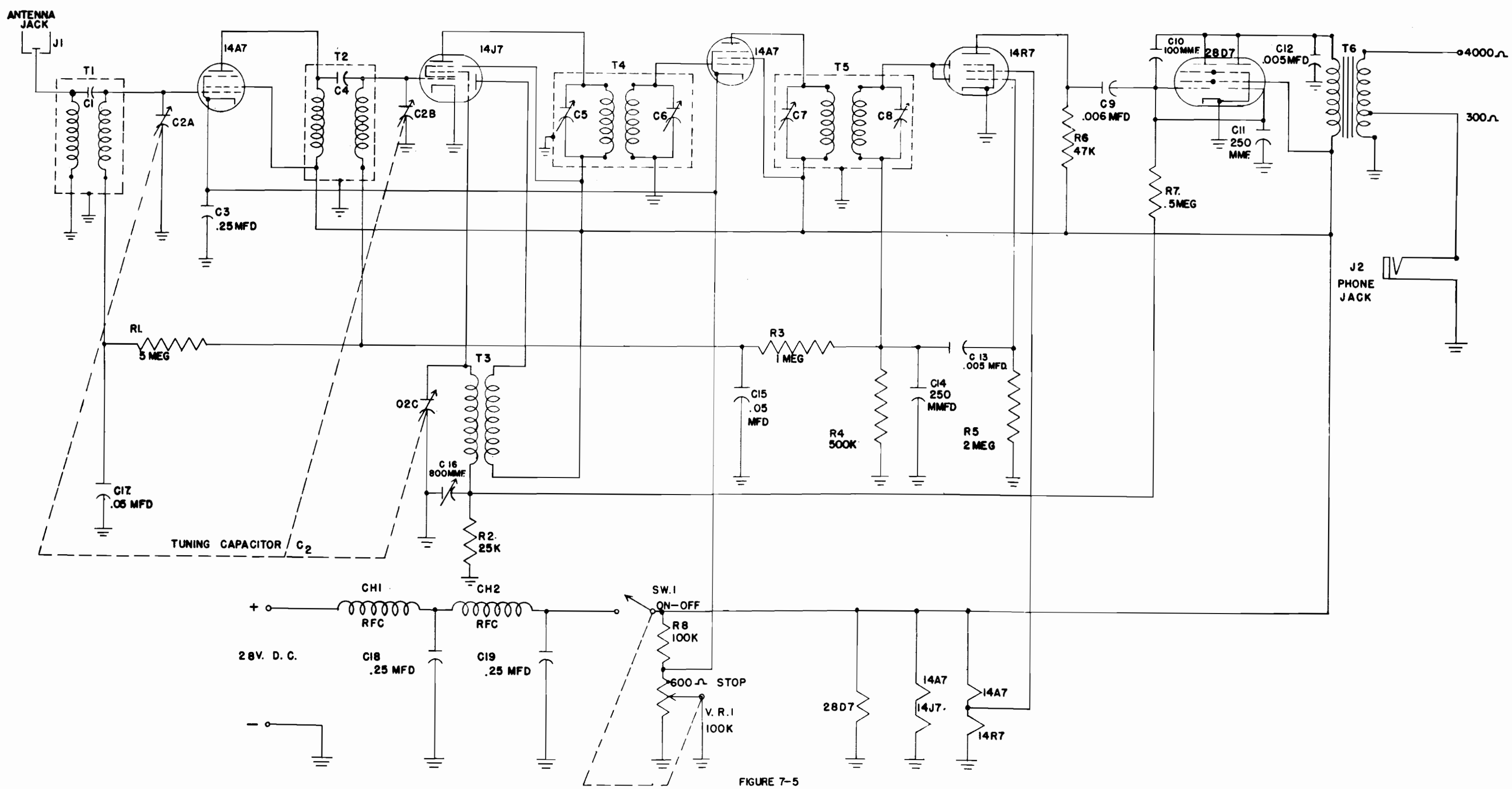
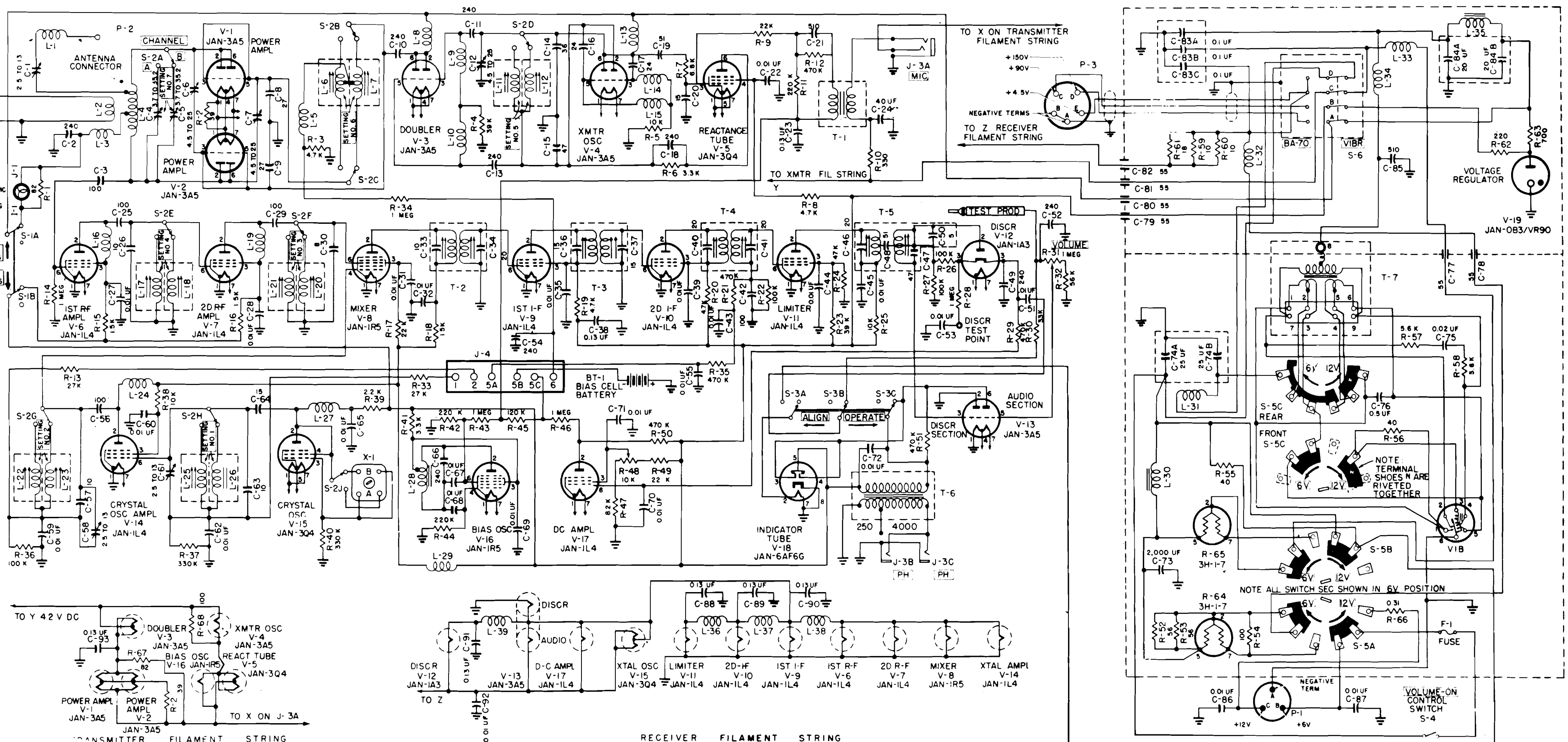


FIGURE 7-5
SCHEM. DIAG. FOR RECEIVER II
(RANGE RECEIVER)

The BC-1335 is a self-contained FM transmitter receiver covering the range of 27 to 38.9 mc. The unit operates on either of two channels, each crystal controlled. One crystal is used per channel. This controls the receiver. The transmitter is monitored by the receiver during transmissions and this causes the transmitter oscillator to be held on frequency by means of a reactance tube across the transmitter oscillator. A carbon microphone such as a T-17 is used with the 1335. The press-to-talk feature of the microphone energizes the transmitter filaments. The receiver output is to a headset. A telephone type handset may be used. The receiver IF is 4.3 mc. The receiver local oscillator is below the signal frequency and uses the fourth harmonic of the crystal.

The power supply uses either 6 or 12 volts (negative ground). Provision is made by the input power plug and a switch to select between input voltages. For positive ground vehicles it will be necessary to reverse the high voltage leads going to the synchronous vibrator

The BC-1335 is manually used with a whip antenna though a coaxial output is also available. Power output is approximately 2 to 4 watts.



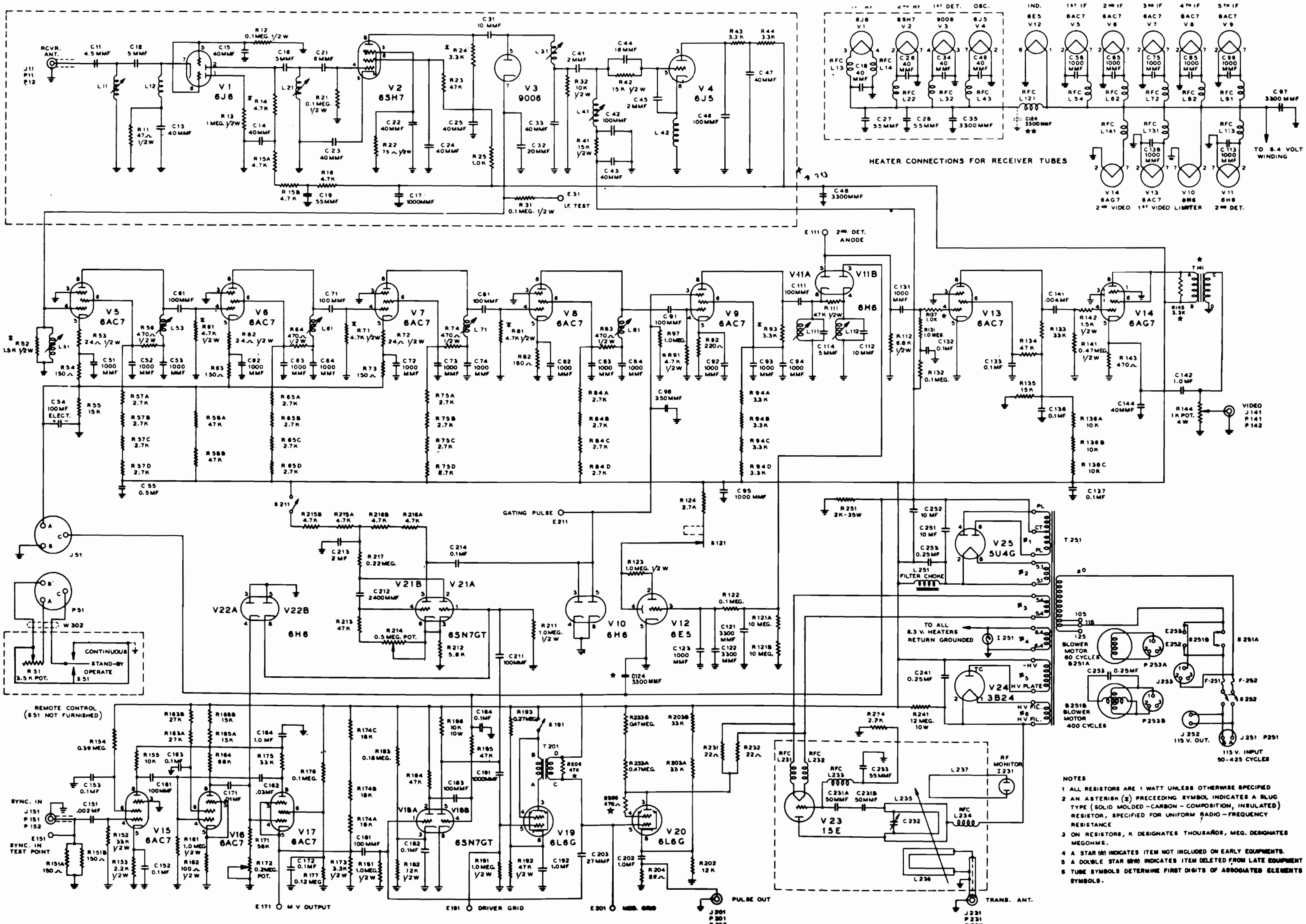
NOTE CHANNEL SWITCH S-2A, S-2B, S-2C, S-2D, S-2E, S-2F, S-2G, S-2H, S-2J SHOWN IN B POSITION

ALL RESISTOR VALUES IN OHMS UNLESS OTHERWISE SPECIFIED
ALL CAPACITOR VALUES IN UUF UNLESS OTHERWISE SPECIFIED

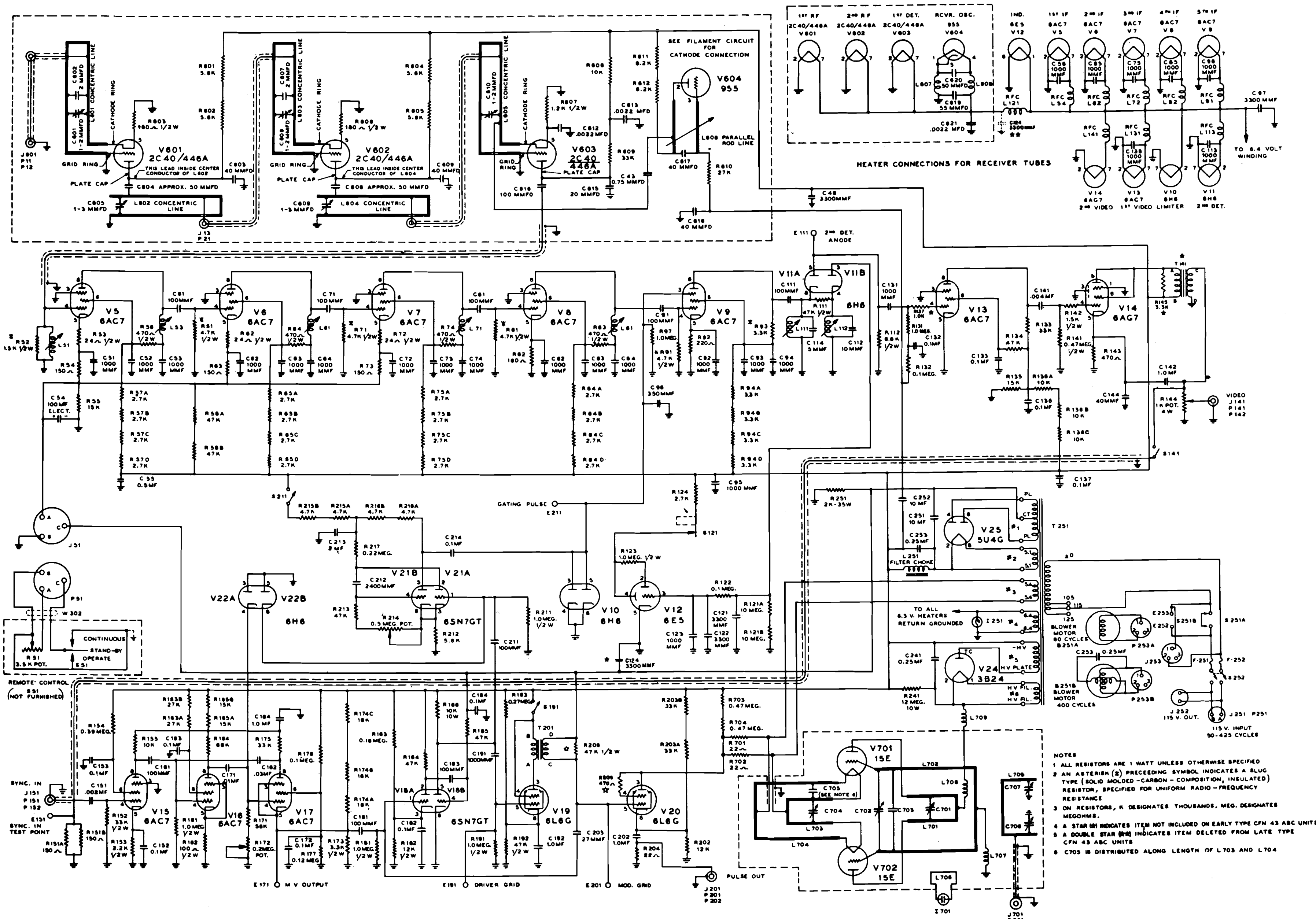
BN

The BN is an IFF transmitter receiver operating in the 157 to 187 mc band. It is designed to operate from 110V 60 cycles. Some models may have been modified to 400 cycles by a change in the blower motor only. The receiver is of the super-heterodyne type using a wide band IF covering 28 to 32 mc. The output of the IF is detected and amplified by a video amplifier with a response from 100 cps to 200 kc.

The RF section has found much use as a converter for 2 meters to a 26 to 30 mc receiver.



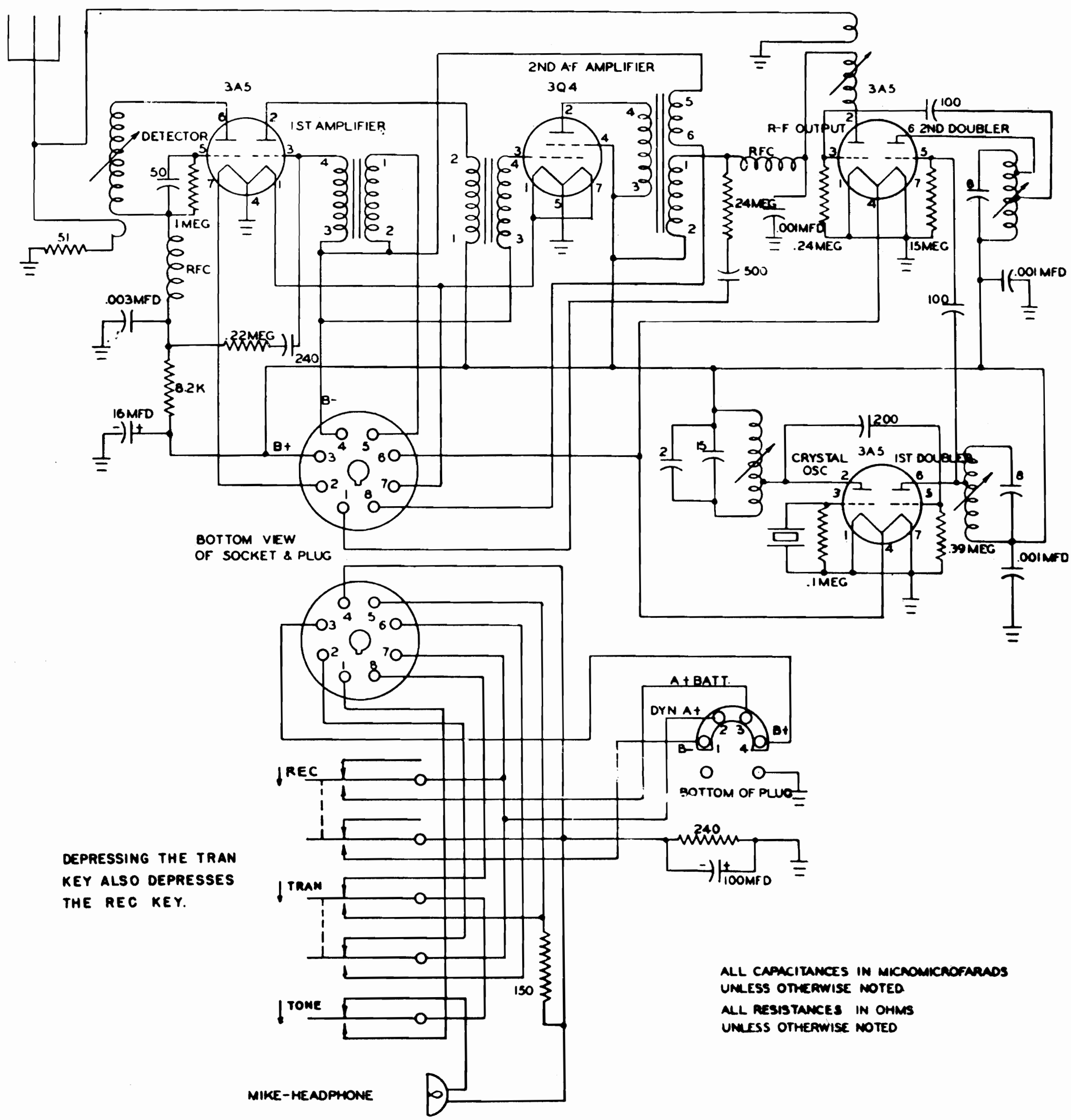
The BP is an IFF equipment very similar in operation, but highly improved over the BN equipment. The primary difference being in the transmitter and receiver RF circuits.



CRC-7

The AN/CRC-7 is a hermetically sealed transceiver with a watertight battery compartment. Transmission is on MCW or AM. Originally designed for operation at 140. 58 mc the hermetically sealed portion may be opened and the crystal changed and the coils trimmed to the 2 meter band. The crystal should be in the 18 mc band for multiplication factor of 8 times. The stages should be tuned with the antenna fully extended.

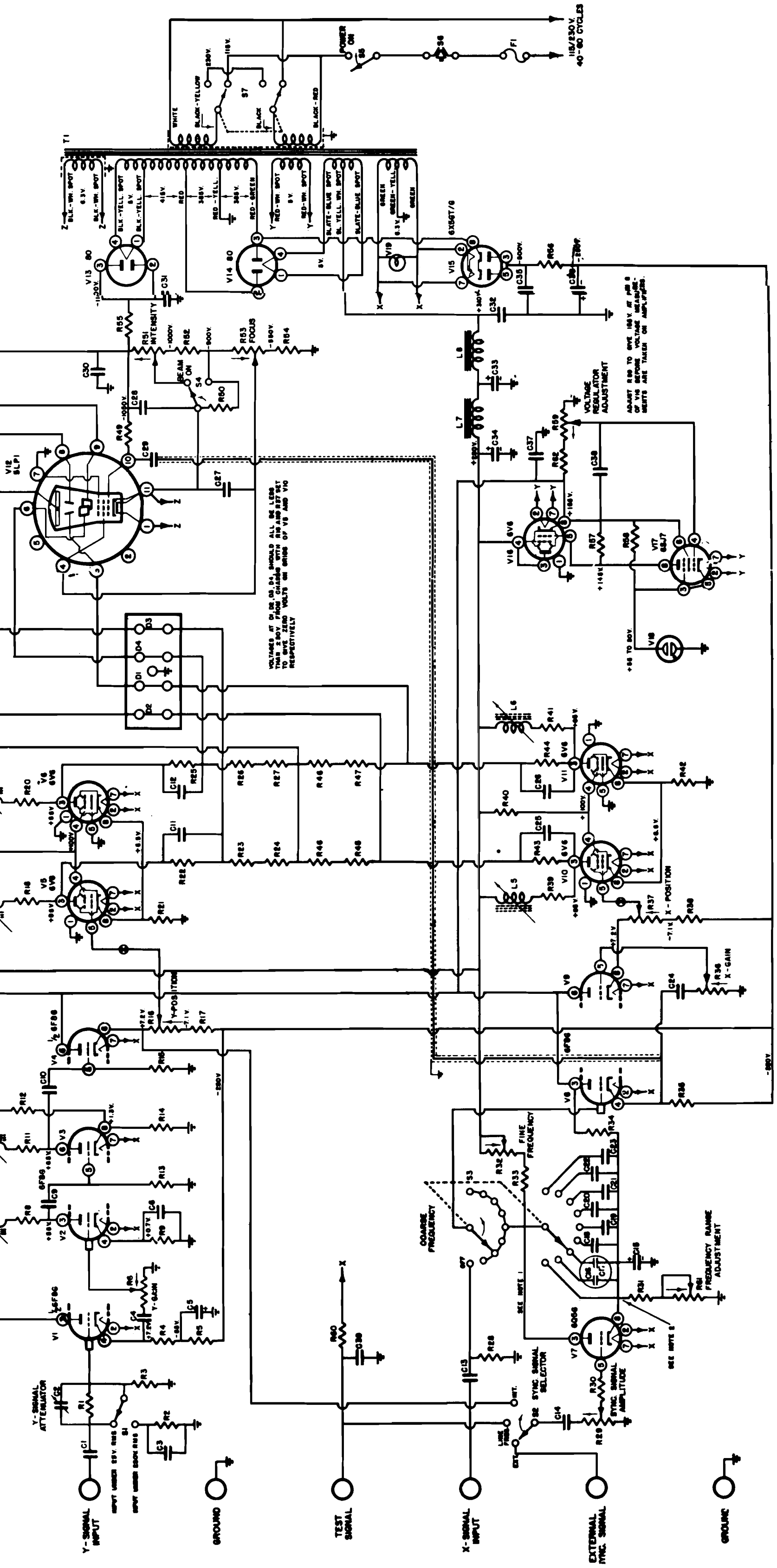
The microphone also serves as headset on receive. Power is switched by turning the appropriate filament switching. See conversion CQ-April '58.



TYPE 208
CATHODE-RAY OSCILLOGRAPH
DD-825-D-5

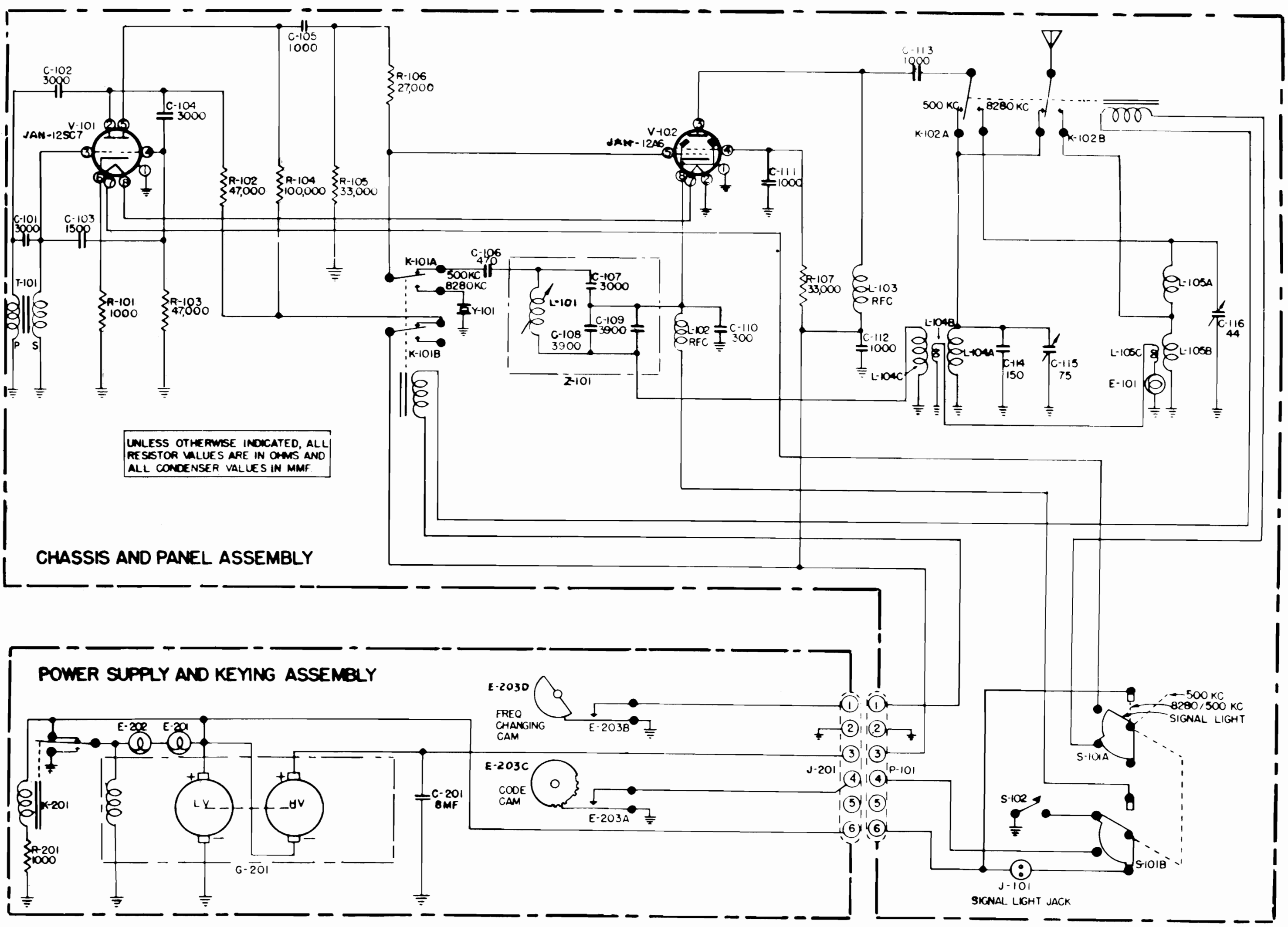
Often available in surplus is the 208 oscilloscope. The vertical input impedance is 5 megohms shunted by 5 mmf while the horizontal input is 2 megohms shunted by 30 mmf. The response is 2 cps to 100 kc. The sweep range is 2 cps to 50 kc.

Pin connections of V1 and V4 should be interchanged



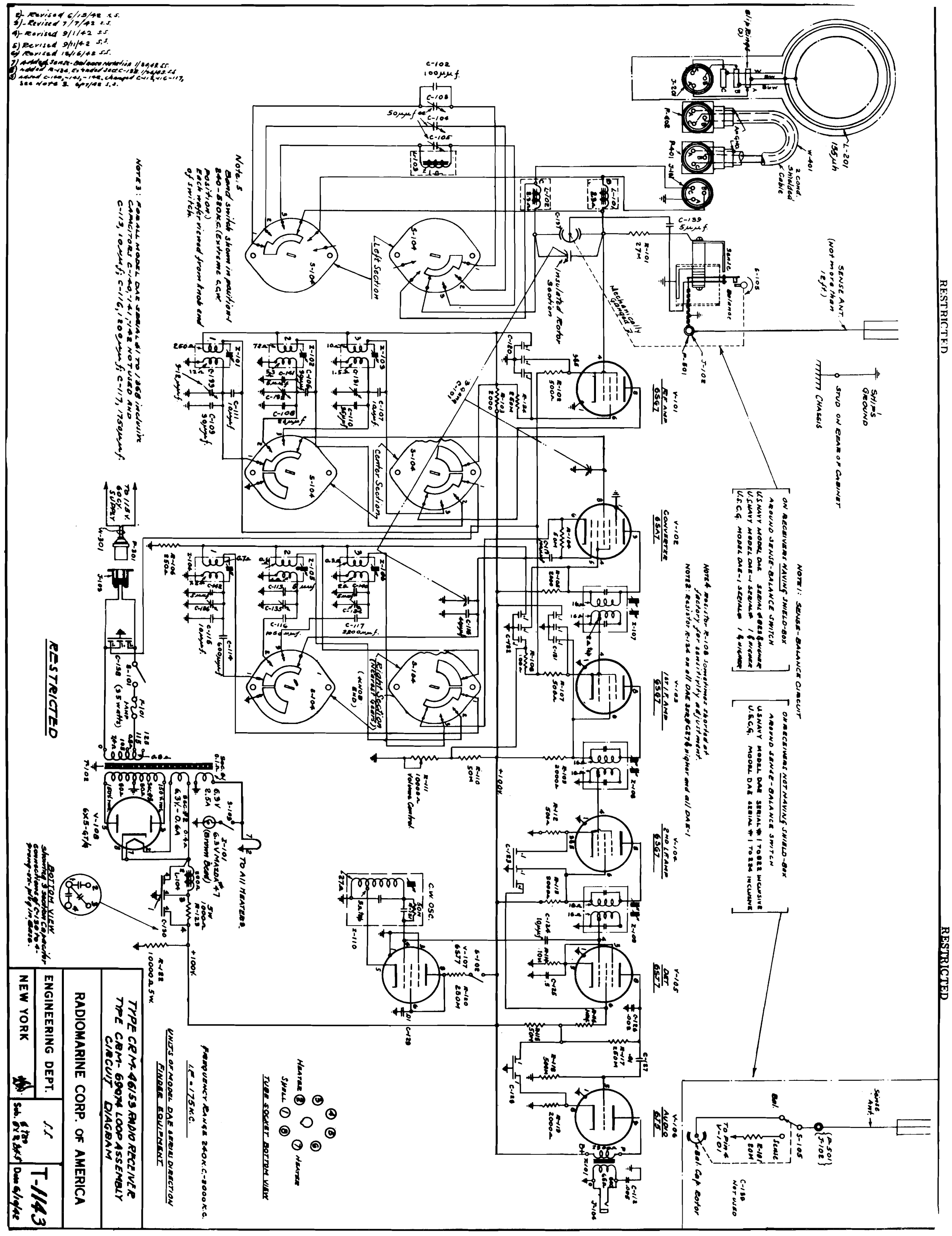
SCHEMATIC OF CIRCUIT

The Gibson Girl transmitter is also known as the AN/CRT-3 because of its similarity to the cathode ray tube shape. It is a transmitter producing 2 1/2 watts on 500 kc and 2 watts in 8280 kc both of which are international distress frequencies. It is normally carried in lifeboats or with other survival equipment. In operation it is held between the operator's legs and the hand crank is turned. A series of coded signals used to key the transmitter are developed by the crank rotation. A generator is operated simultaneously to supply filament and plate power to the transmitter. Power is also supplied to a visual lamp for night operation. The antenna is held aloft by either a kite or a balloon provision being made to generate hydrogen for balloon inflation. Hand keying is possible.



DAE

The DAE is a direction finder. It is a superheterodyne receiver covering the frequency range of 240 to 2000 kc. The input power is 115 volts 60 cps although accessories are available for inputs of 24, 32 or 115 volts DC. The direction finder loop is separate from the receiver for installations aboard ship. The intermediate frequency is 175 kc. The input is from the loop and sense antenna. The output is to head phones of 600 ohm impedance. A BFO is provided for CW reception, but no AVC is available.

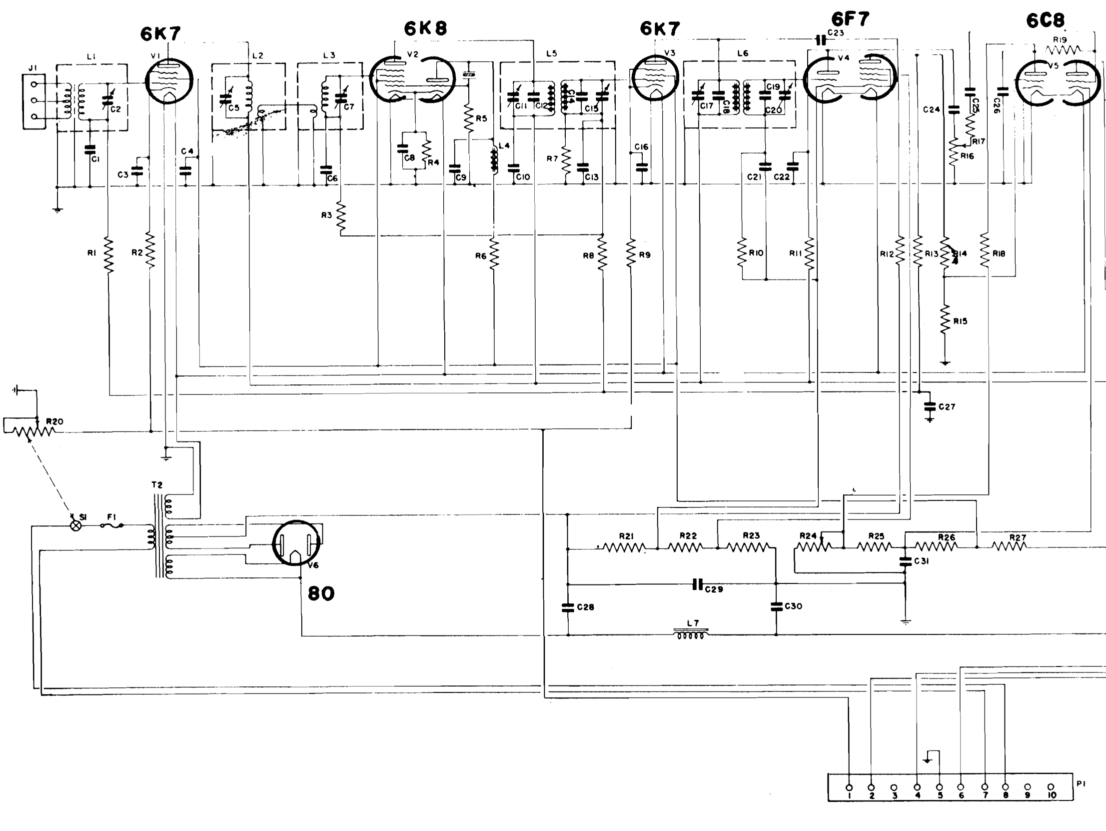


F-3

The Wilcox F-3 (ARC-3) receiver is a rack-mounted fixed frequency receiver covering the range of 1900 to 16500 kc range. Some models may cover different frequencies from these in standard groups.

Group 1	1900 to 3600 kc
Group 2	3100 to 6100 kc
Group 3	5100 to 10000 kc
Group 4	8100 to 16500

The F-3 is a superheterodyne using a crystal controlled oscillator and has a 455 kc IF. AVC and a Morse suppressor are provided.



PARTS LIST

NO.	VALUE
C1	.01 MFD 400V
C2	100 MMFD
C3	.1 MFD 400V
C4	.1 MFD 400V
C5	100 MMFD
C6	.01 MFD 400V
C7	100 MMFD
C8	.1 MFD 400V
C9	50 MMFD 400V
C10	.1 MFD 400V
C11	35 MMFD.
C12	100 MMFD 400V
C13	.01 MFD. 400V
C14	100 MMFD 400V.
C15	35 MMFD.

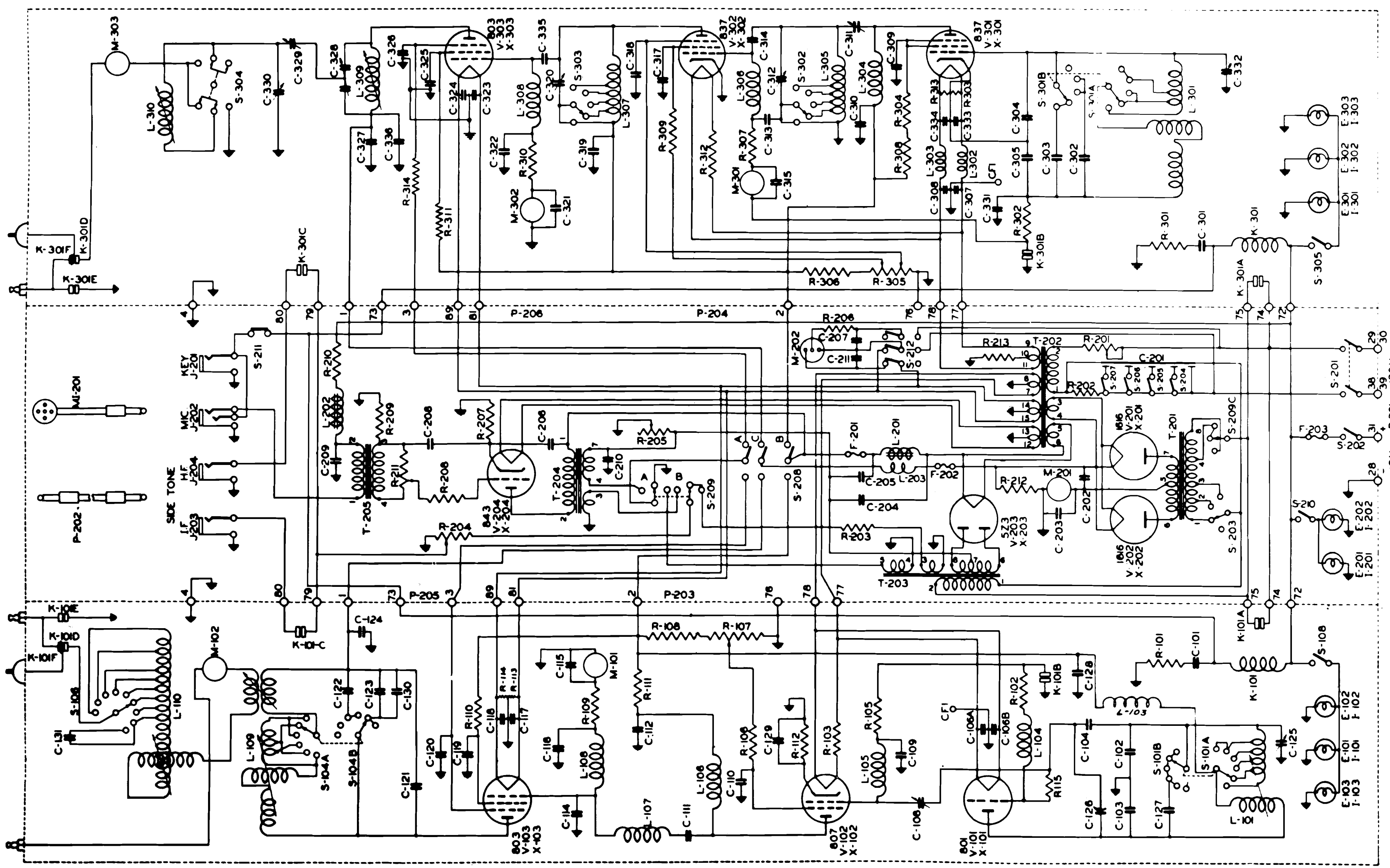
PARTS LIST

NO.	VALUE
C16	1 MFD 400V
C17	35 MMFD
C18	100 MMFD 400V
C19	100 MMFD 400V
C20	35 MMFD
C21	500 MMFD 400V
C22	250 MMFD 400V
C23	50 MMFD 400V
C24	.01 MFD 400V
C25	.01 MFD 400V.
C26	.05 MFD 400V
C27	1 MFD. 400V
C28	8 MFD. 450V
C29	8 MFD 250V
C30	8 MFD. 450V.
C31	20 MFD. 150V.
F1	2 AMP.
J1	1506
J2	A1
L1	ANTENNA COIL
L2	PLATE COIL
L3	GRID COIL
L4	R.F. CHOKE
L5	INPUT I.F.
L6	OUTPUT I.F.
L7	FILTER CHOKE
P1	P310AB
R1	.1 MEG. OHM 1W.
R2	400 OHMS 1W.
R3	.1 MEG OHM 1W.
R4	100 OHMS 1W.
R5	50M OHMS 1W.
R6	25M " 1W.
R7	.5 MEG. OHM 1W.
R8	.5 " " 1W.
R9	400 OHMS 1W.
R10	1 MEG. OHM 1W.
R11	.25 " " 1W.
R12	.5 " " 1W.
R13	.5 " " 1W.
R14	.25 " " 1W.
R15	75 M OHMS 1W.
R16	.1 MEG. OHM
R17	25M OHMS
R18	.5 MEG. OHM 1W.
R19	.1 " " 1W.
R20	.5M OHMS
R21	500 " 10W.
R22	1M " 10W.
R23	3M " 10W.
R24	5M "
R25	250 " 1W.
R26	10M " 10W.
R27	5M " 10W.
S1	10
T1	T43970
T2	463-1780
V1	6K7
V2	6K8
V3	6K7
V4	6F7
V5	6C8
V6	80

GO-9

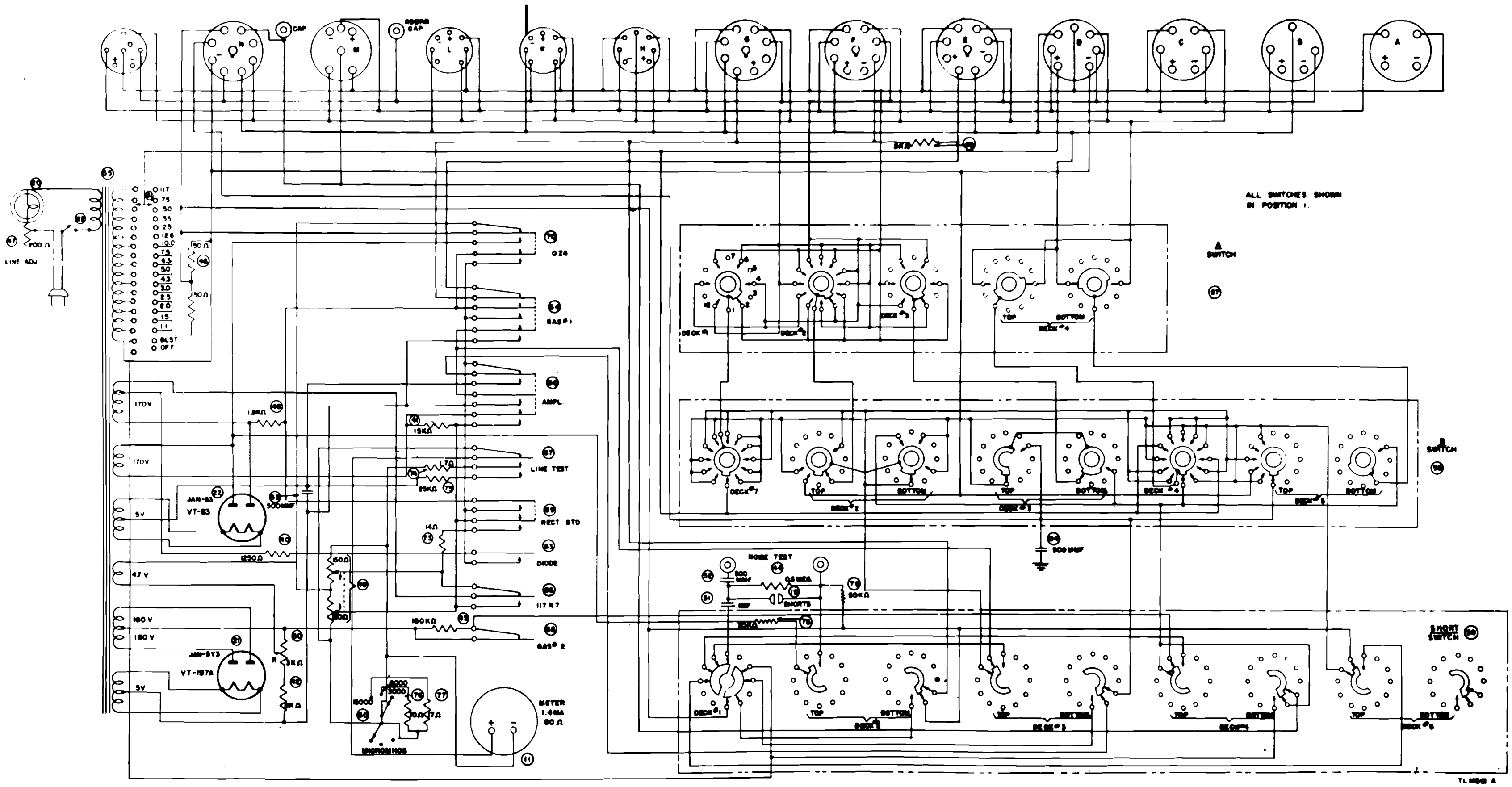
The GO-9 is a Naval Airforce transmitter for use on patrol aircraft.. It is rated at 100 watts and covers a frequency range of 300 to 600 kc and 3.0 to 18.1 mc. The equipment is constructed in three side-by-side sections, the middle one being a power distribution section. Input power is 110V 800 cps, and either 12 or 24 volts dc.

The TBW is very similar to the GO-9.



I-177

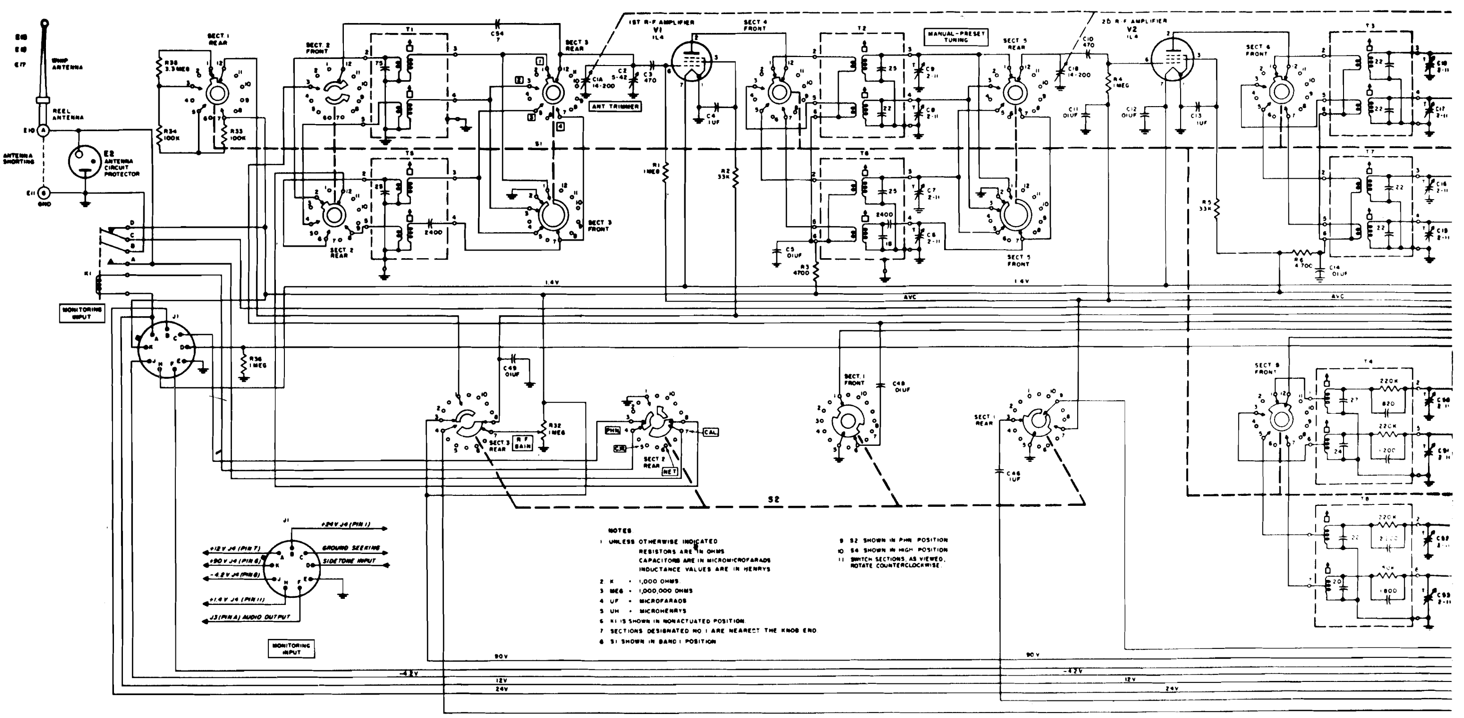
The I-177 is a transconductance type tube-tester (part of test set I-56-K). An adapter can easily be made for testing the newer tubes (Noval based 9 pin) See September, 1959 CQ for more data.

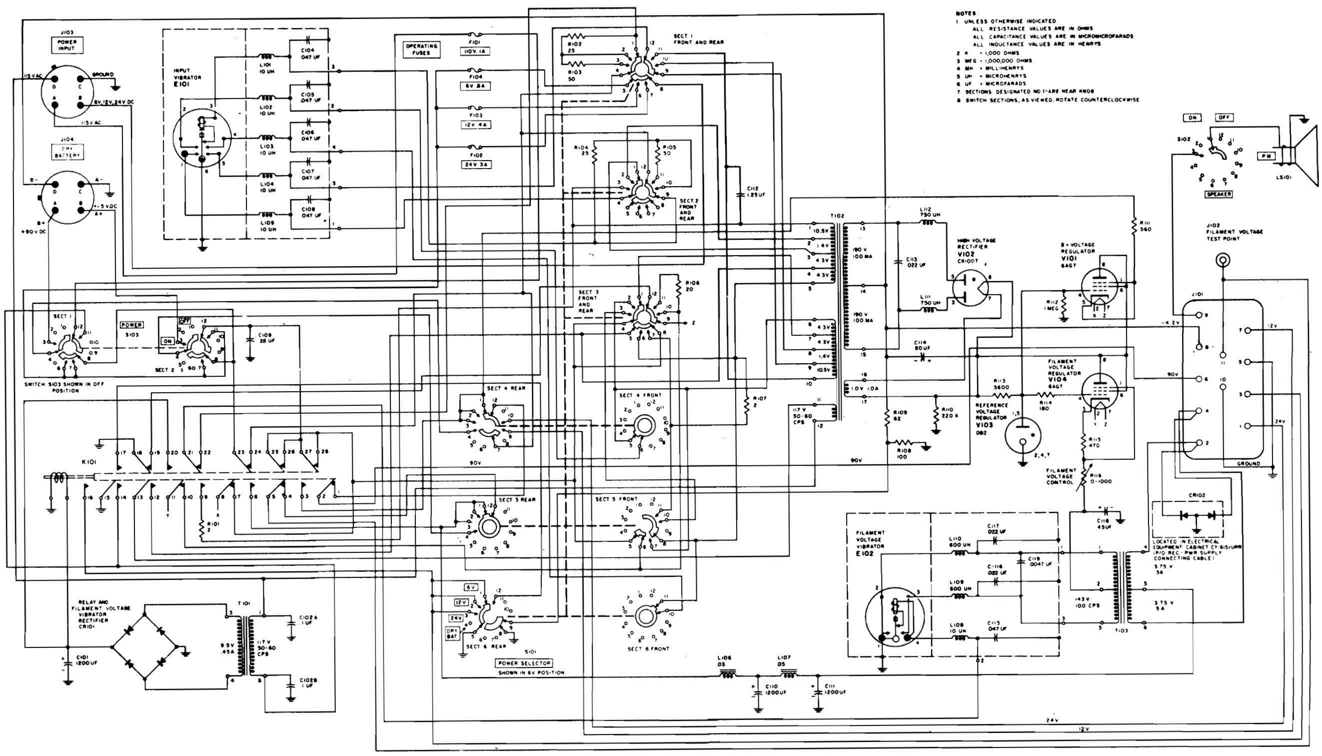


AN/GRR-5

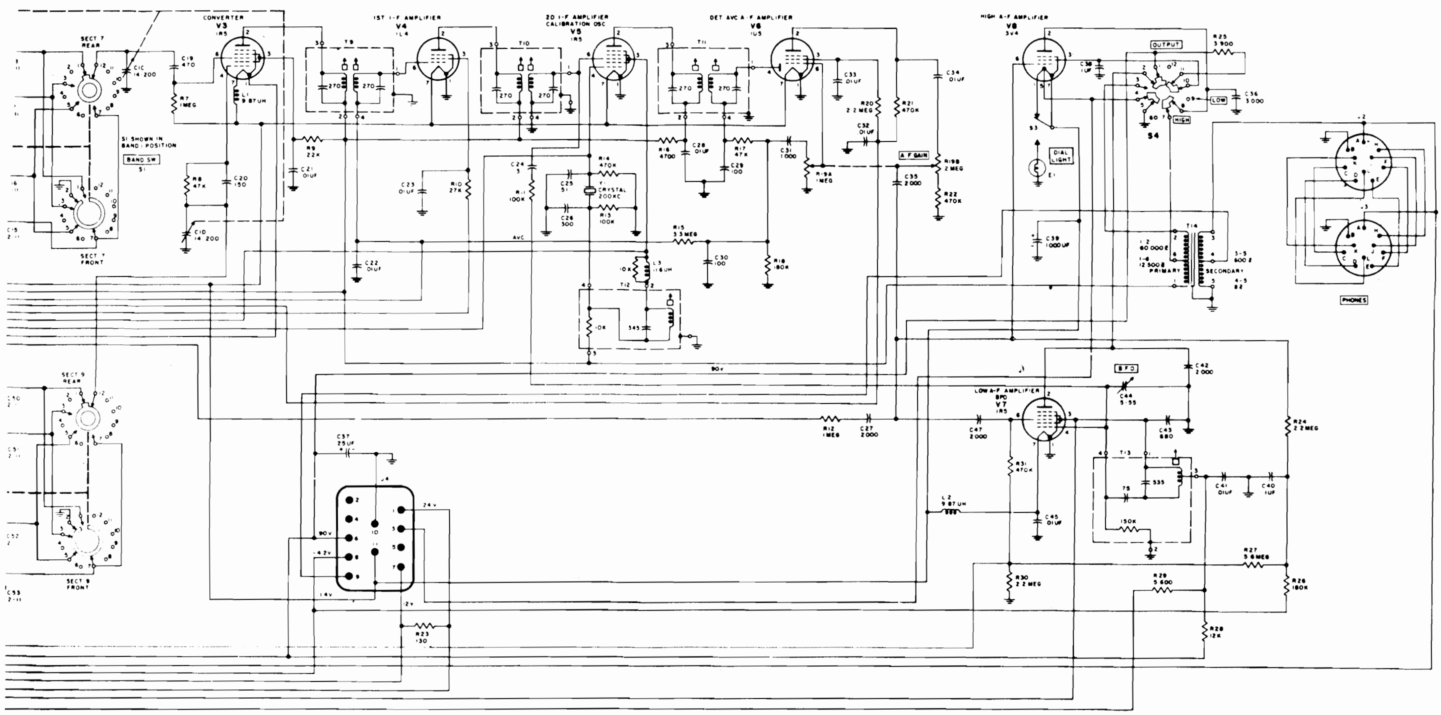
The AN/GRR-5 is a mobile radio receiver used for tactical purposes. It may be used with its internal speaker, or with handsets or other equipment. It covers a frequency range of 1. 5 mc to 18 mc. It can operate from 6, 12 or 24 volts dc for mobile use, 115 volts 60 cycles for fixed use or from 1. 5 volts at 350 ma and 90 volts at 27 ma for portable use. It is capable of reception of AM, CW, MCW. Provision is made for ten preset frequencies, although the equipment is capable of continuous tuning. A built in crystal calibrator supplies a check point every 200 kc. The intermediate frequency is 455 kc.

The equipment is divided into two sections. The receiver proper is known as the Radio Receiver R-174/URR while the power supply is known as the Power Supply PP-308/URR.





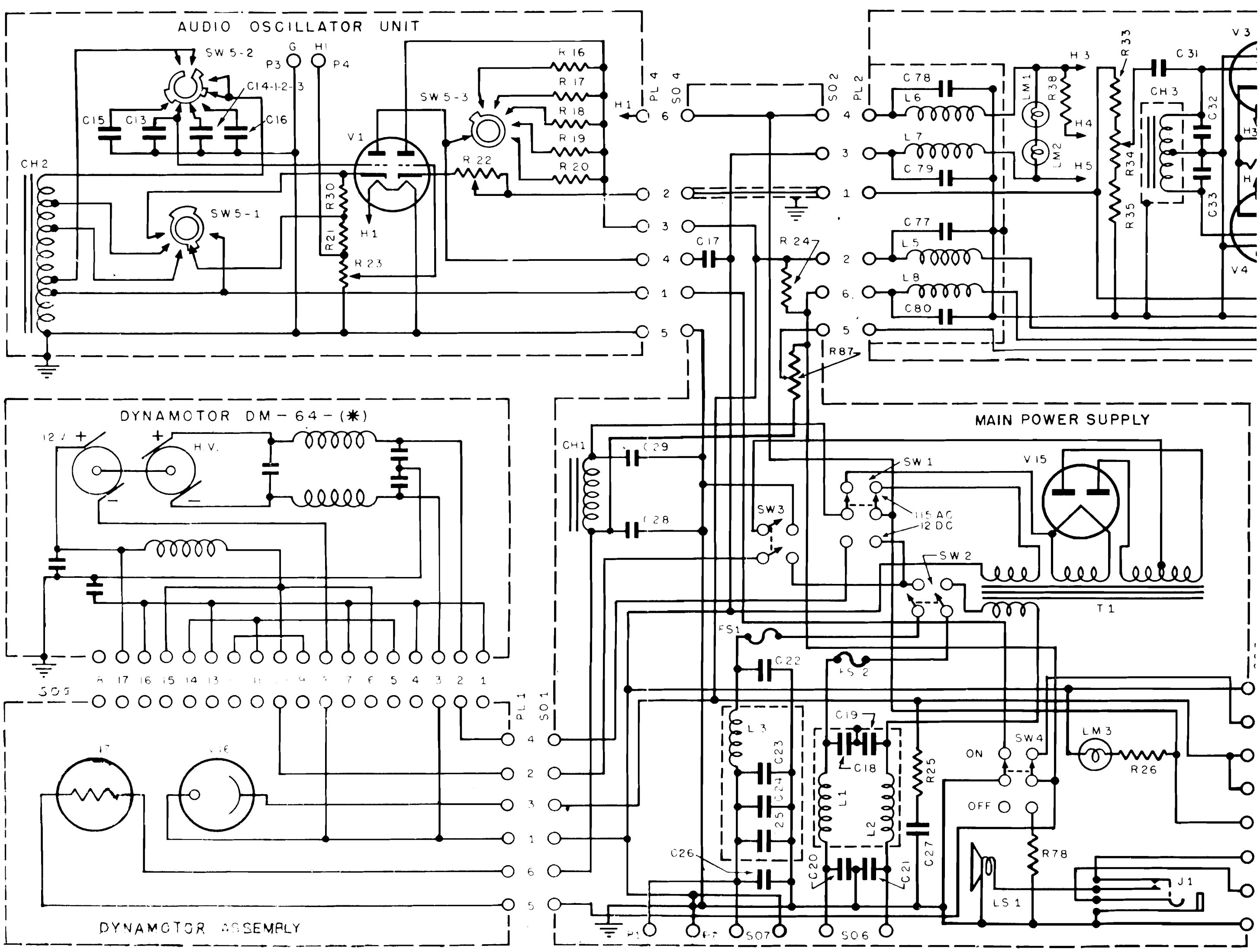
Power Supply PP-308/URR, schematic diagram.



I-208

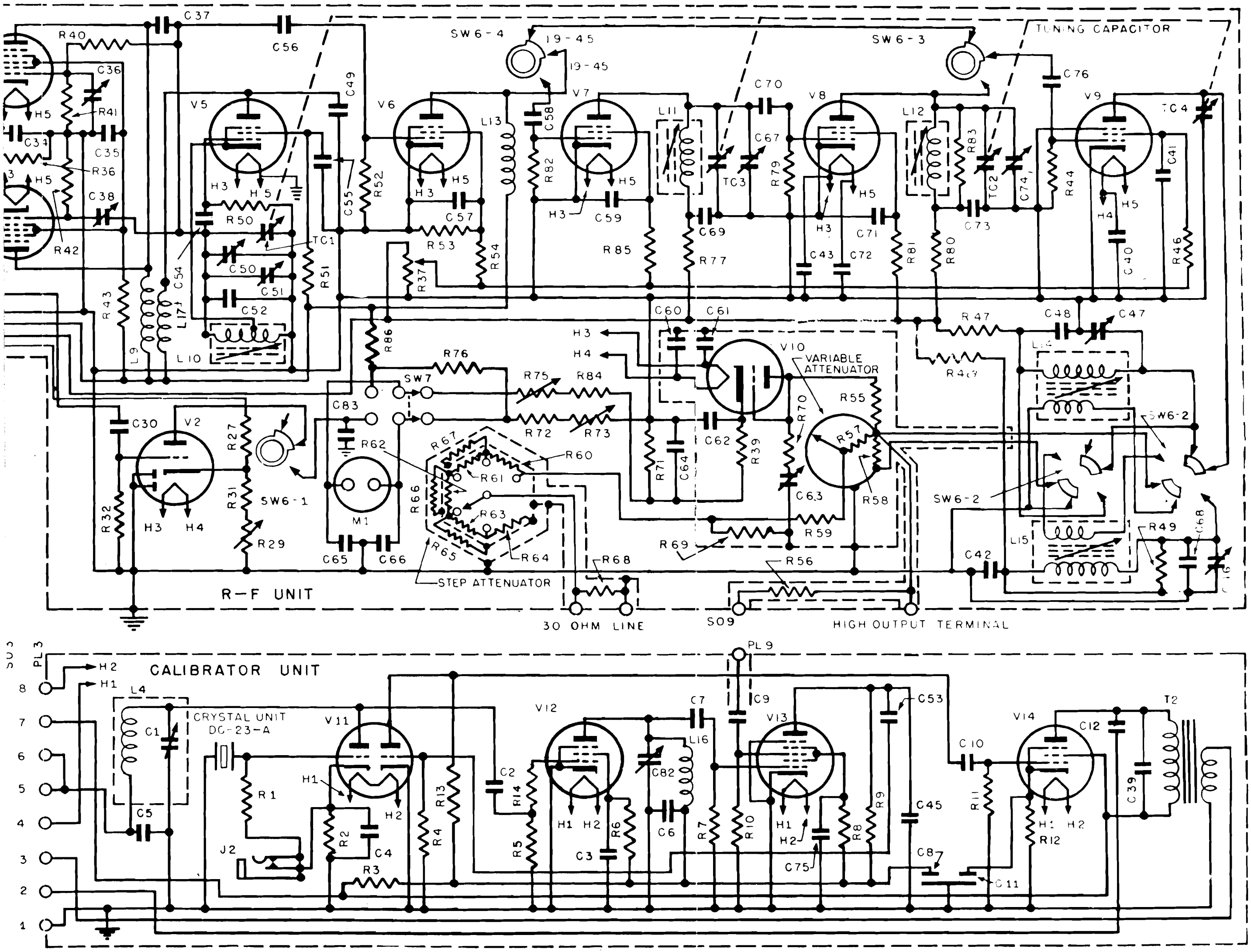
The signal generator I-208 covers the frequencies of 1.90 to 4.5 mc and 19 mc to 45 mc. It is used to align FM equipment such as the BC-603 and BC-683.

The frequency deviation can be adjusted from 0 to 5 kc on each side of the center frequency of the 1.9 to 4.5 mc band, and from 0 to 50 kc either side of the 19 to 45 mc. Five modulation frequencies are provided: 150, 400, 1000, 2500



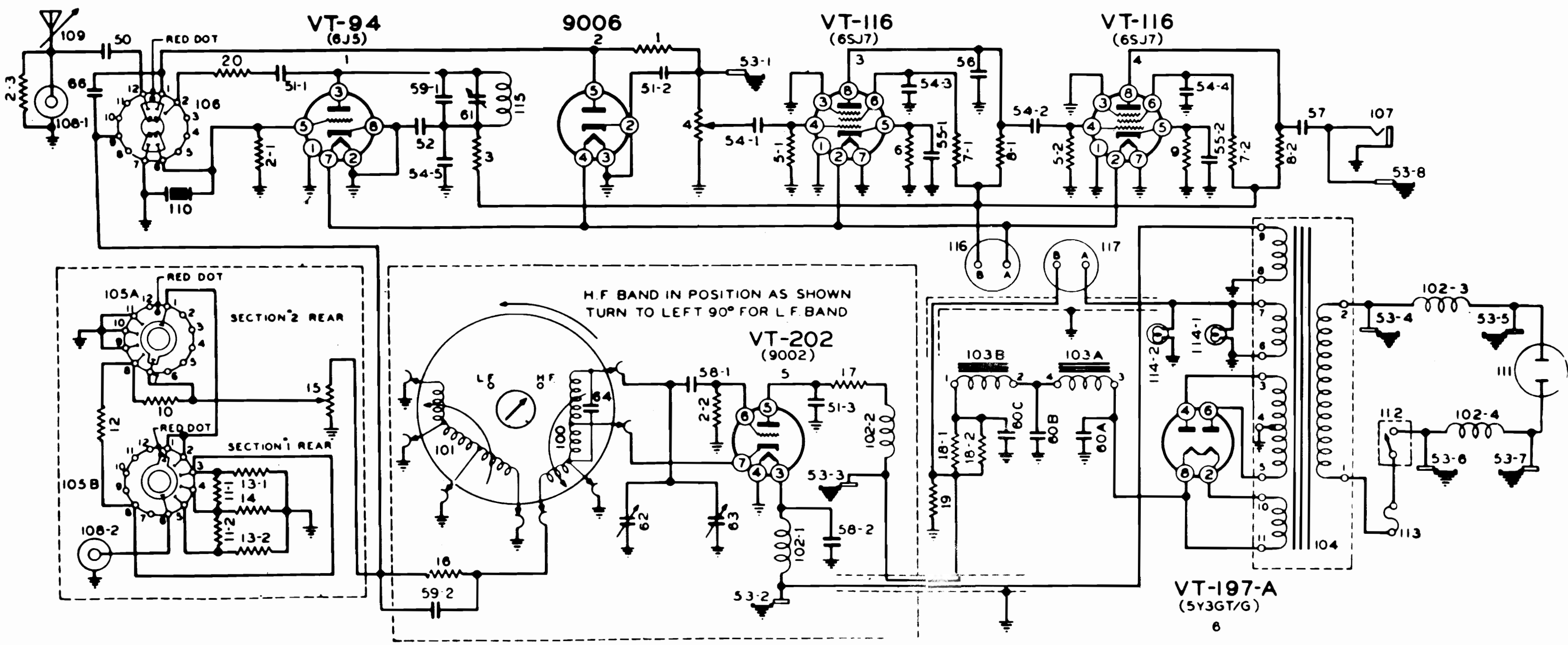
and 5000 cps. External modulation is possible. Up to 0.1 volt is developed at the end of the cable (30 ohm transmission line). Up to 0.84 volt is available from the high output line. An attenuator is used to set the output as needed.

Power is either 12 volts dc or 115V 60 cps.



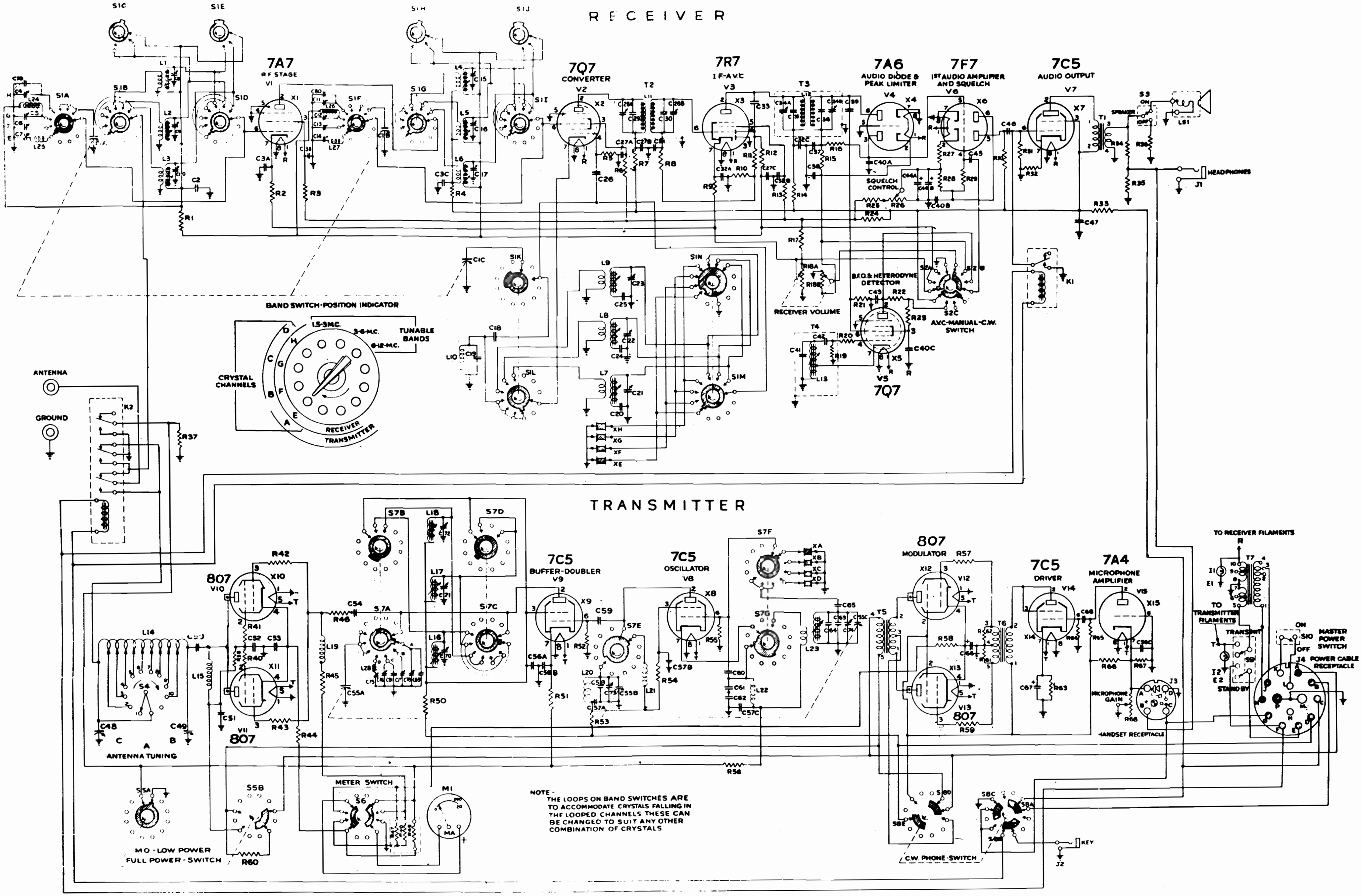
I-122

This equipment provides RF signals for the alignments and operation of the RC-182 and RC-282, and similar equipments. It provides signals for both IF and RF alignments in two bands, 8 to 15 mc and 135 to 230 mc (on third harmonic of 45 to 76 mc). A 5 mc crystal calibrator built in, allows the use of the I-222-A as a heterodyne frequency meter.



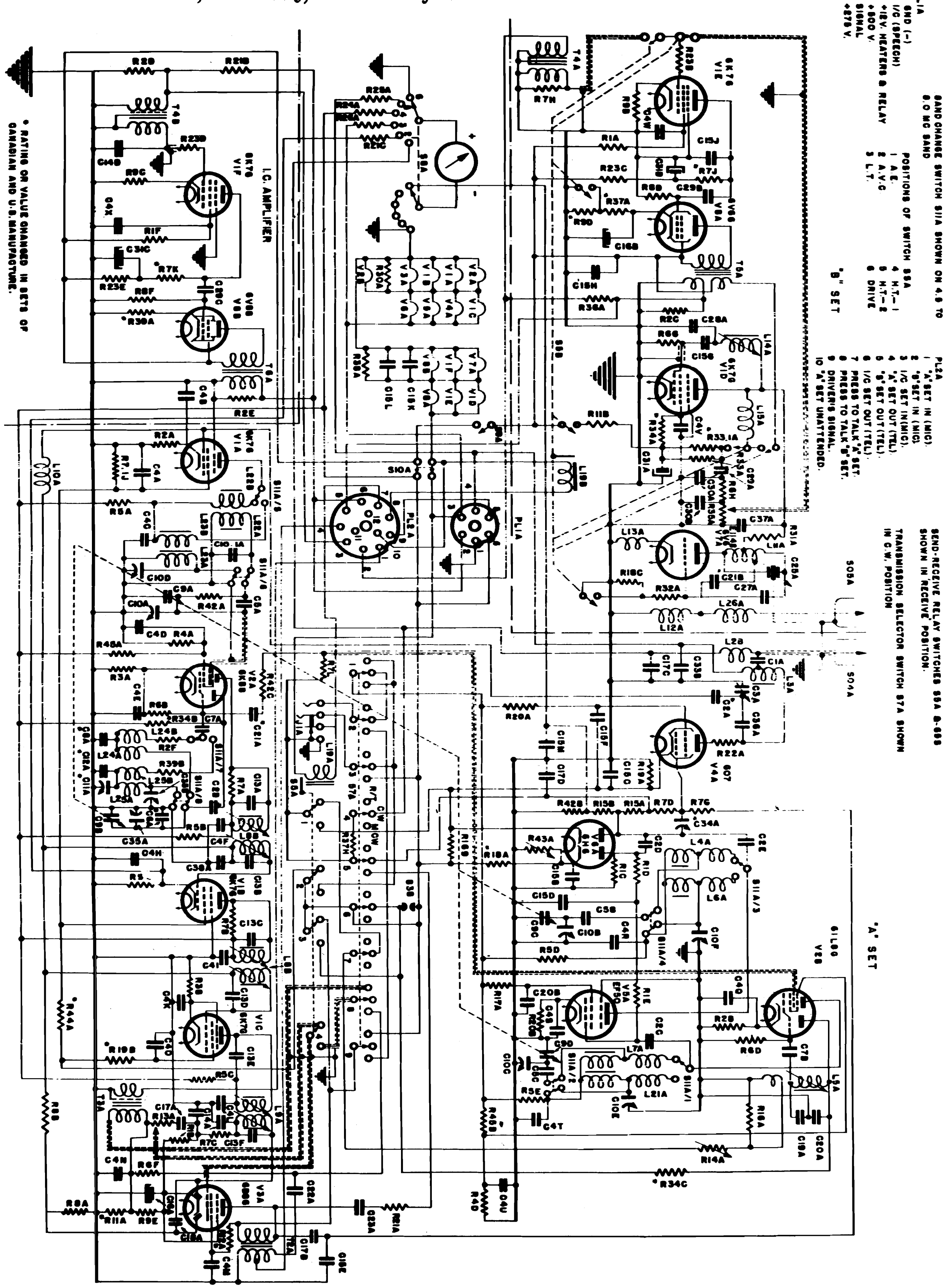
JT-350A

The Jefferson-Travis 350A transmitter-receiver covers 1.5-12 mc in three bands. IF 455 kc. 75 Watt CW or AM VFO or XTAL. Power: 12, 24, 32, 115 vdc, 115 vac. This is a nice rig.



Mark II

The Mark II was originally designed for export to Russia for use in tanks. If you have a tank, this may be a good unit for you. While it is true that many of these units have been converted for use in the amateur bands, the effort involved to achieve a reasonable result is almost superhuman. For practical conversion data, see CQ, February 1957.



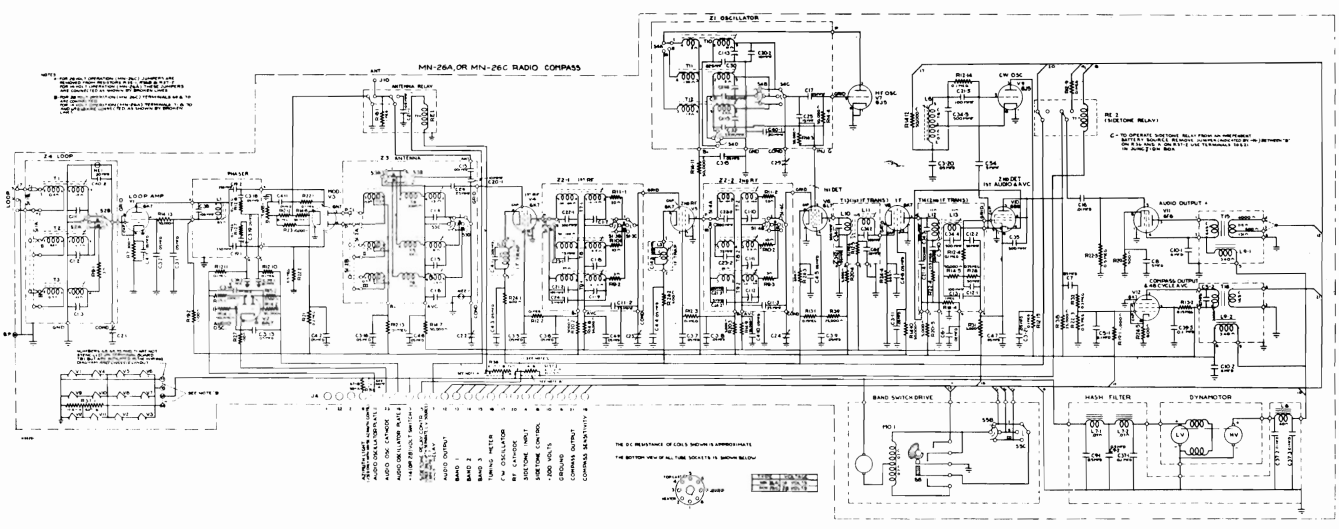
MN-26

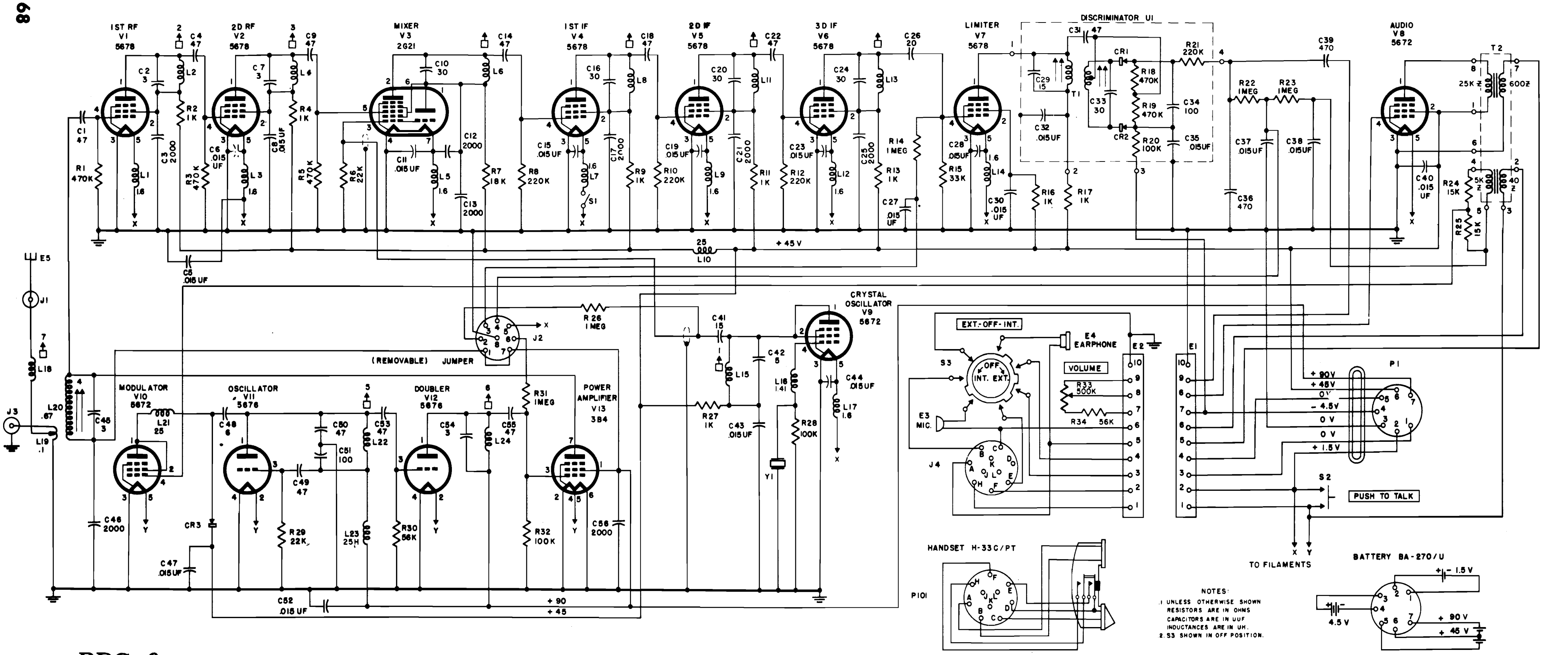
The MN-26 is an aircraft communication direction finder type superheterodyne receiver. It covers a variety of frequencies and input voltages of either 14 or 28 volts The last letter designates the frequency range and voltage as given in the following table.

Letter	Freq. Range	Input Voltage
A	150-1500 kc	14
C (and CA)	150-1500 kc	28
M	200-850 kc	28
	3. 4-7. 0 kc	
W	200-1750	14
X	200-1750	28
Y	150-695 kc	28
	3. 4-7. 0 kc	28

The MN-26 () requires a remote control box, MN-28, a loop antenna MN-20 or MN-24, azimuth indicators MN-40D or MN-22A, and suitable mechanical (flexible shaft) and electrical cables.

The receiver itself is located remotely in the aircraft so as to save cockpit space. For a tuning meter, the MR-57A is used, and the IN-4A is a left-right meter for homing. The loop is mounted outside of the aircraft and rotates.

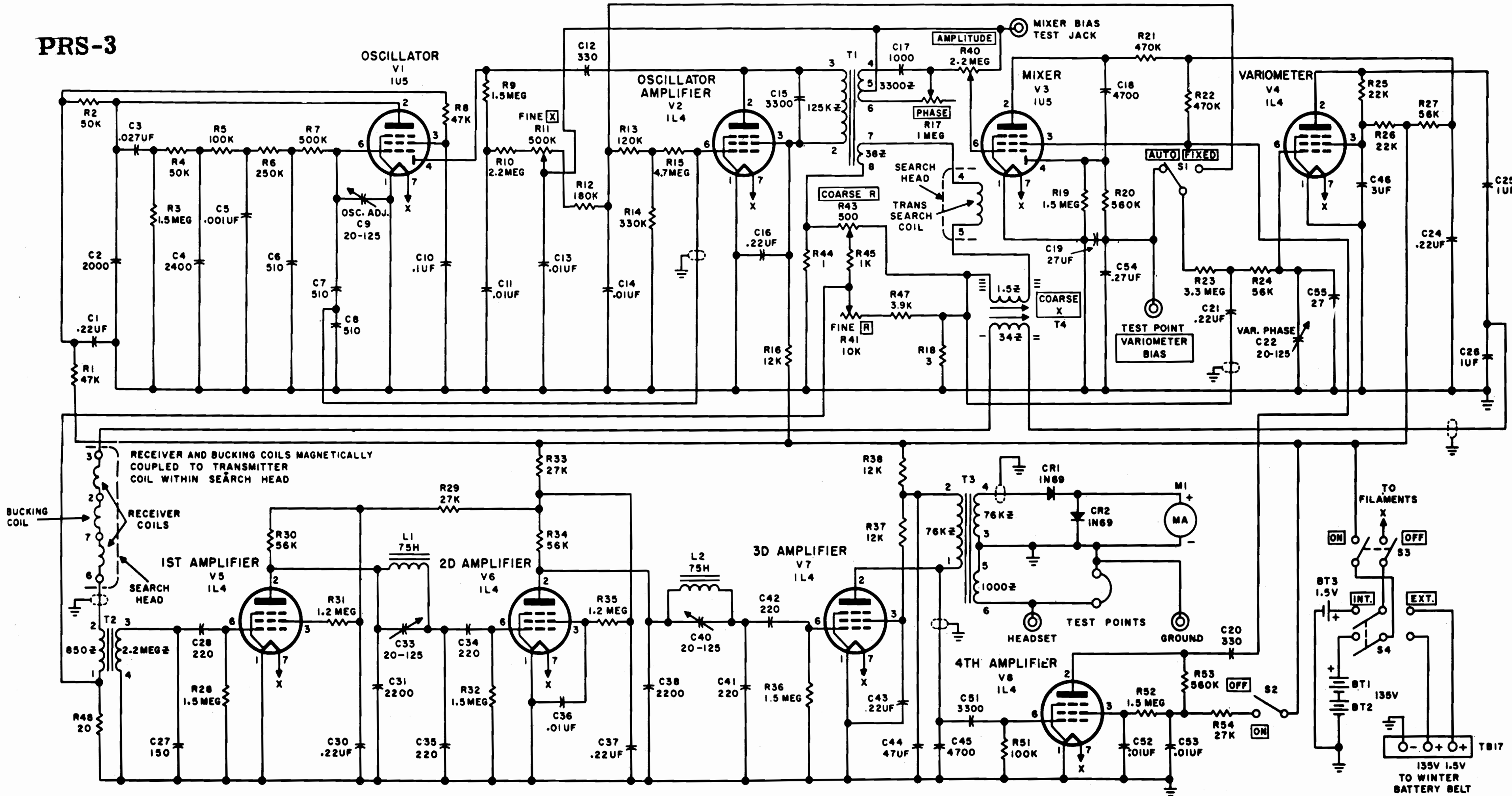




PRC-6

The PRC-6 is a handi-talkie type equipment operating in the frequency range of 47 to 55.4 mc on one of 47 preset channels. It is frequency modulated and has a range of about one mile. It has a transmitter power output of about one-quarter watt. The entire unit is self contained including batteries and may be hand held like a telephone. The transmitter employs four tubes, plus nine in the receiver which also supply AFC control. Power requirements of the transmitter are 1.5 volts at 1 ampere, 45 volts at 14 ma and 90 volts at 28 ma. The total receiver power requirements are 1.5 volts at 440 ma. and 45 volts at 13 ma. The receiver is a superheterodyne type and uses a 4.3 mc IF. The receiver local oscillator is preset by crystal control and both receiver and the transmitter are tuned to the same frequency. The transmitter is reactance controlled to the preset frequency and the same reactance control is used for modulation. A volume control is provided to adjust receiver level. A built-in antenna is provided and is used by both transmitter and receiver. Provision ismade for use of a separate antenna. Provision is also made for the use of a separate handset when desired.

PRS-3

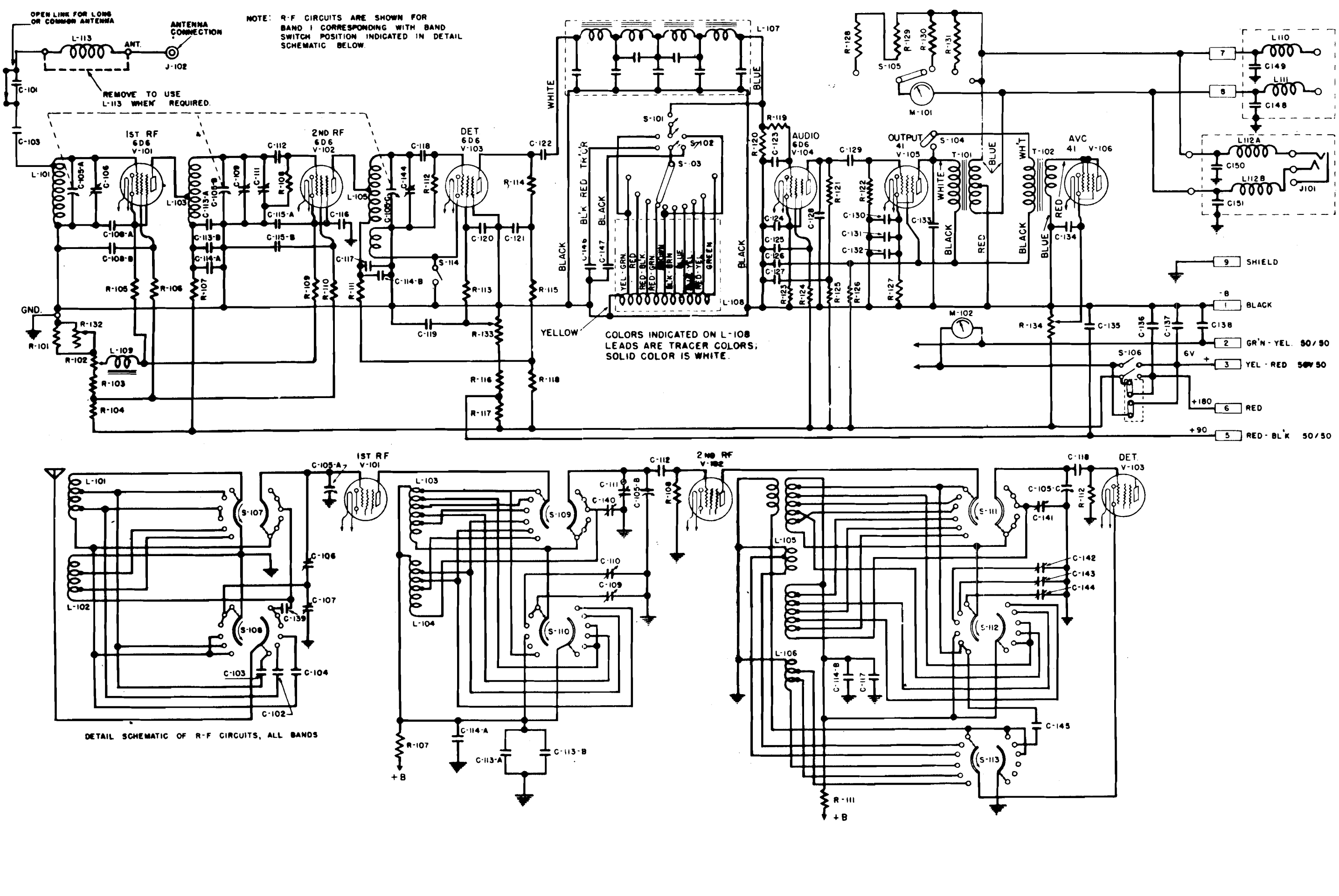


The AN/PRS-3 is a mine detector apparatus. It operates by having a single transmitter head (coil of wire) energized by a 1000 cycle signal, which is in turn received by four receive coils located adjacent to the transmit coil. Any metal located near the field of energy of the head is likely to cause an unbalance in the signal received by the pick-up heads and can be detected. The detected signal is read on a meter, and can be heard in a set of earphones worn by the operator. The design of the head will allow the equipment to operate properly in the presence of magnetic ores without the unbalance that would be expected. The required voltages are 1.5 volts for the filaments and 135 volts for the plate supply. The equipment is actually built in two sections, the probe assembly, and the electronic assembly, complete with batteries. Various models have been made, with only minor differences between them.

RAK

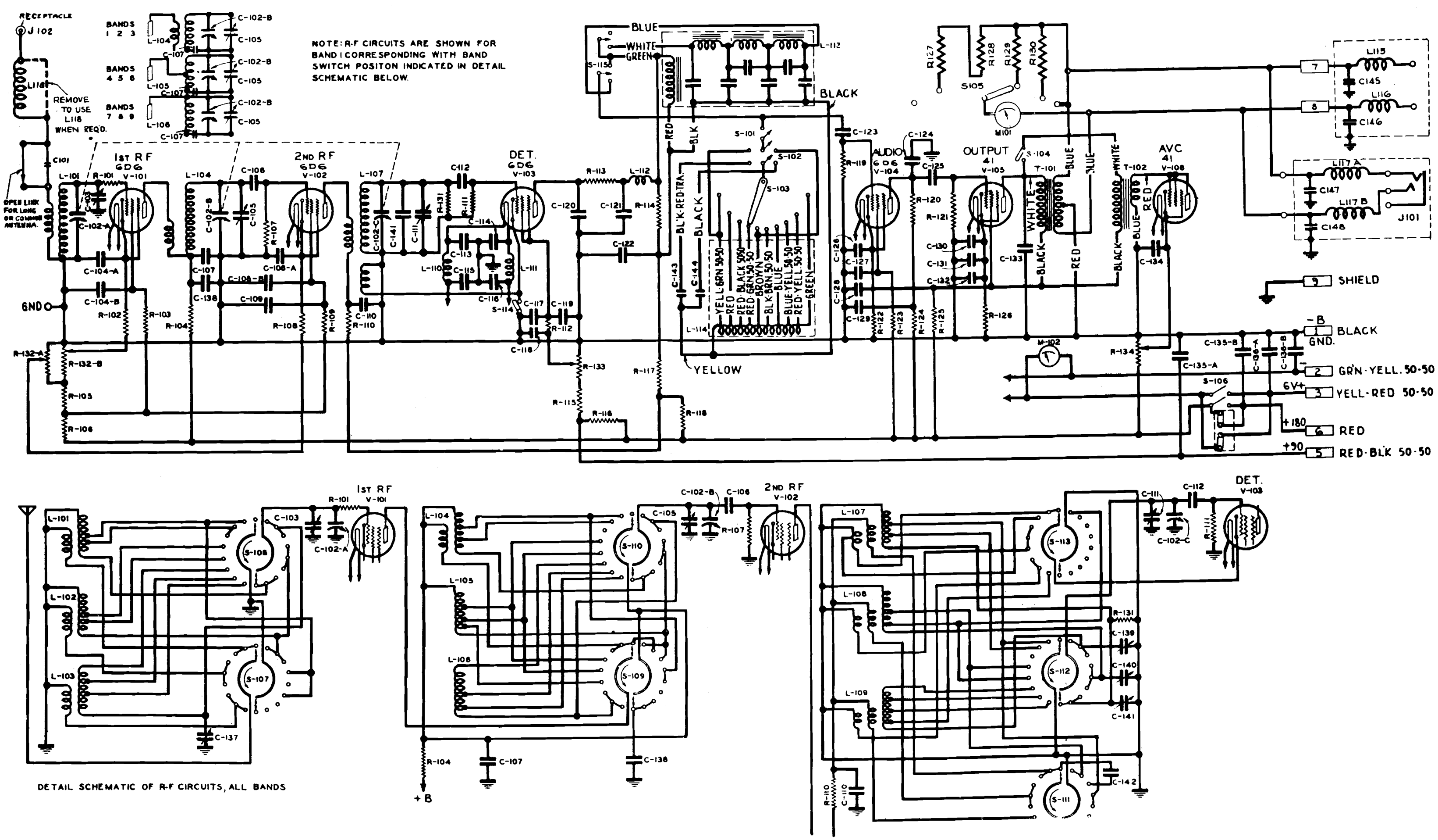
The RAK is a Navy low frequency receiver covering 15 to 600 kc. It operates with a power supply input of 115V 60 cycles. Battery operation is also possible.

The circuit consists of two stages of RF amplification and a regenerative detector. Bandswitching is used to cover the total range, and a series of sharp filters are employed to eliminate interference.



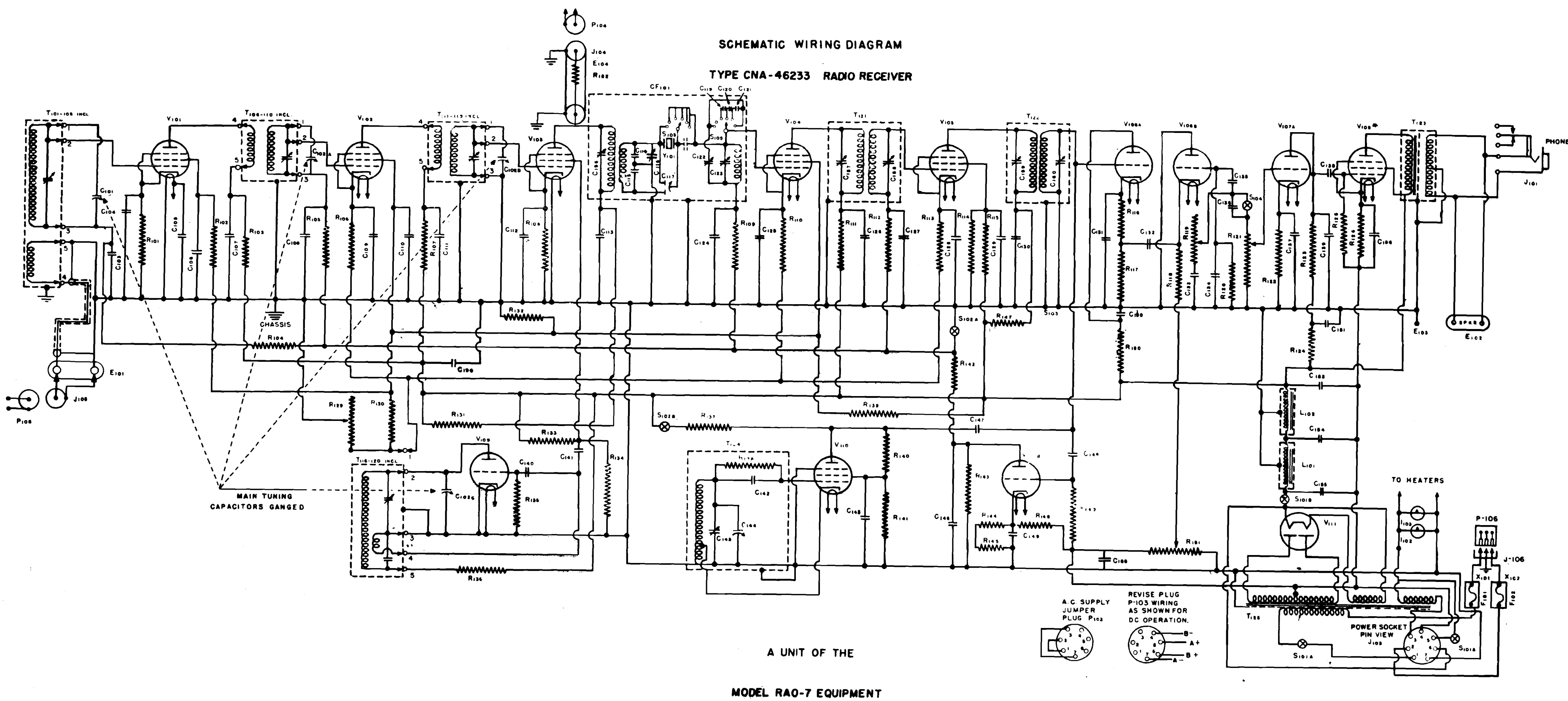
RAL

The RAL is a TRF receiver covering 300 kc - 23 mc in nine bands. Sensitivity is quite good due to the regenerative detector and selectivity is achieved with a variable audio filter. A separate AC power supply is used. The RAK is the low frequency counterpart of this receiver. While it is possible to use the RAL for amateur communications, it is an almost hopeless antique and certainly not worthy of any conversion efforts.



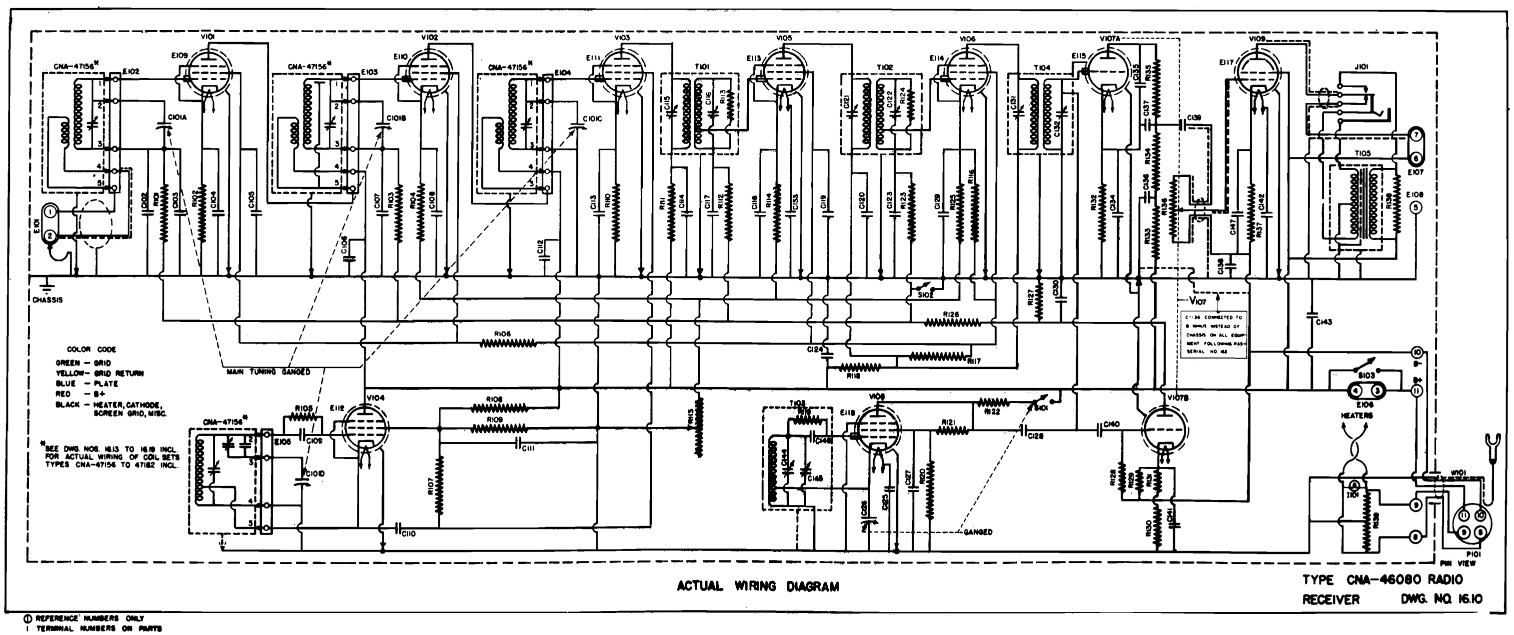
RAO-7

The RAO-7 is the Navy model of the NC-100XA National receiver. The main difference being the addition of a second rf stage for reduced radiation from the local oscillator and the omission of the "S"-Meter. The RAO is a general coverage receiver with no electrical bandspread and covers from 540-kc to 30 mc with an IF of 455 kc. Odd numbered models (5, 7, etc.) operated from 115 VAC, 60 cycles.



RAS

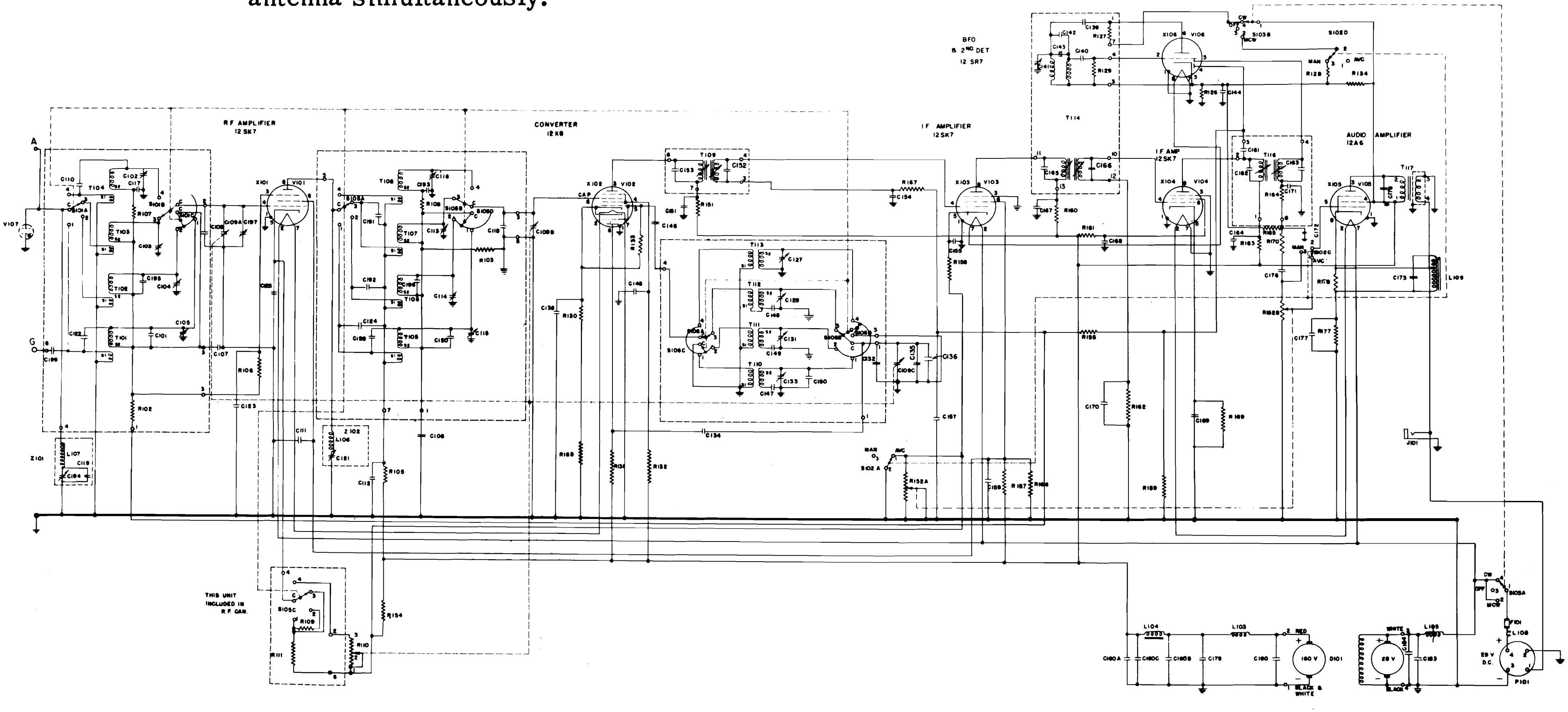
The RAS is the famous National HRO receiver with a thin Navy disguise. It covers from 190 kc to 30 mc with seven plug in coil drawers. A separate AC power supply was used. IF frequency is 175 kc.



RAX

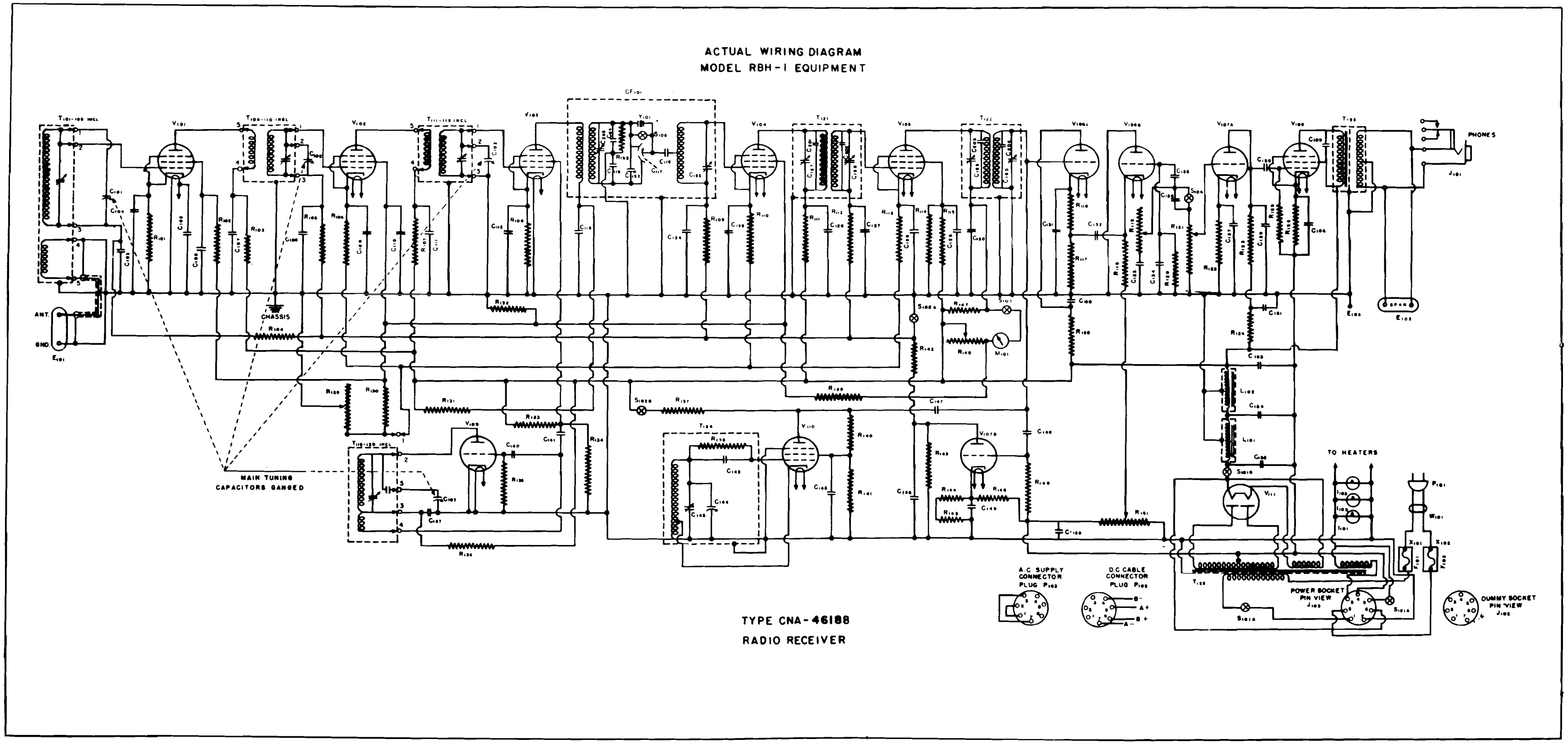
The RAX aircraft radio equipment is a receiver system designed for the U. S. Naval Air Force and covers a range of 200 kc to 27 mc, in three individual receivers. Unit 1, Navy model CG-46115 covers the range of 200 kc to 1500 kc in four bands. Unit 2 Navy model CG-46116 covers the frequency range of 1500 to 9000 kc in four bands, and Unit 3, Navy model CG-46117 covers the frequency range of 7000 to 27000 kc in five bands. Each receiver has a power supply consisting of a dynamotor, the output power of which is 166 volts at 90 ma, operating from an input of 28 volts.

Each receiver is a superheterodyne with unit 1 having an IF of 160 kc, unit 2 having an IF of 915 kc and unit 3 having an IF of 2275 kc. Each unit is capable of receiving CW as well as voice and MCW, and are designed to operate from a common antenna simultaneously.



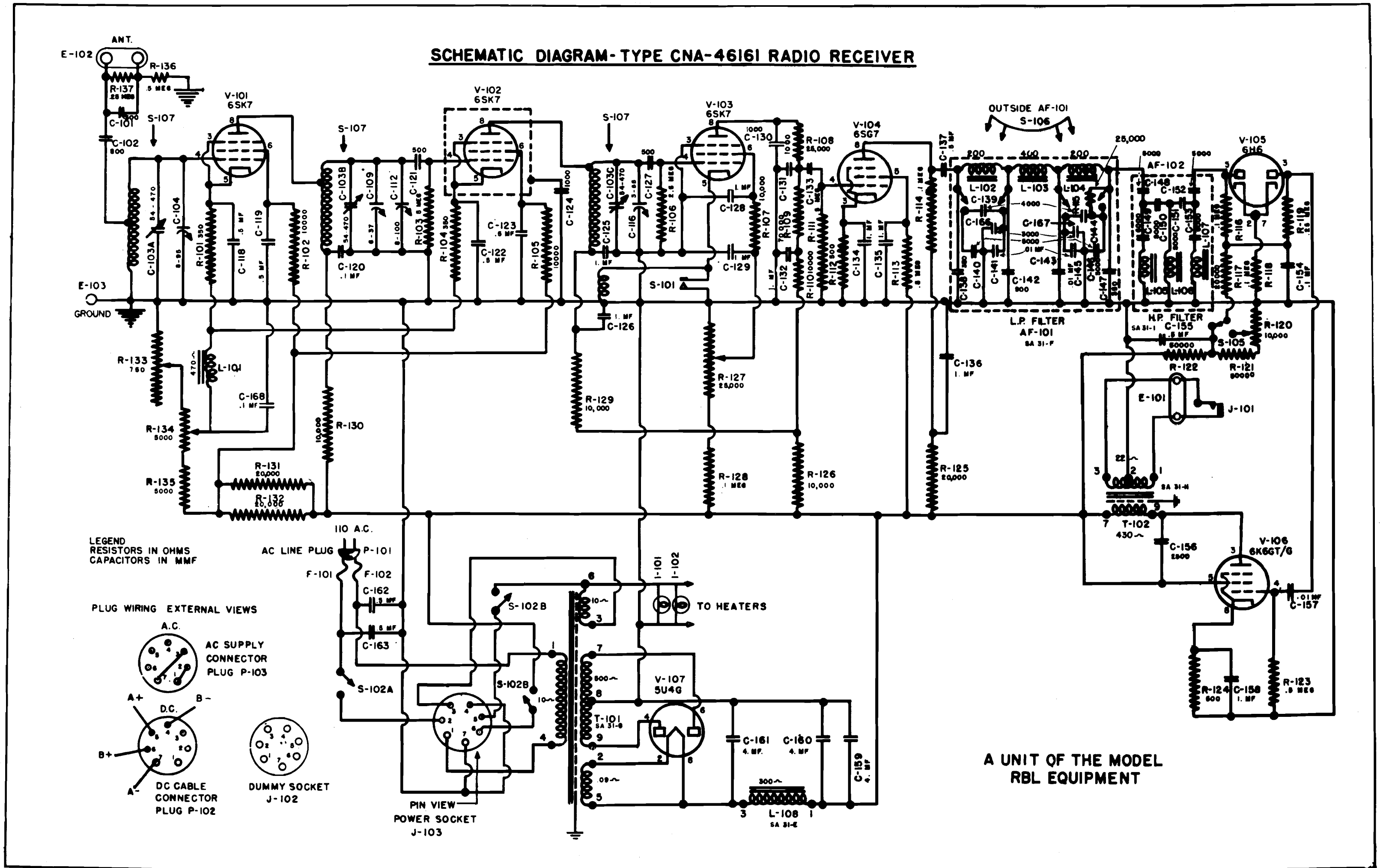
RBH

The RBH is a Navy receiver similar in design to the National NC-100 but covering the range 300-1200 kc and 1.7 - 16 mc. It has an IF of 1560 kc.



RBL

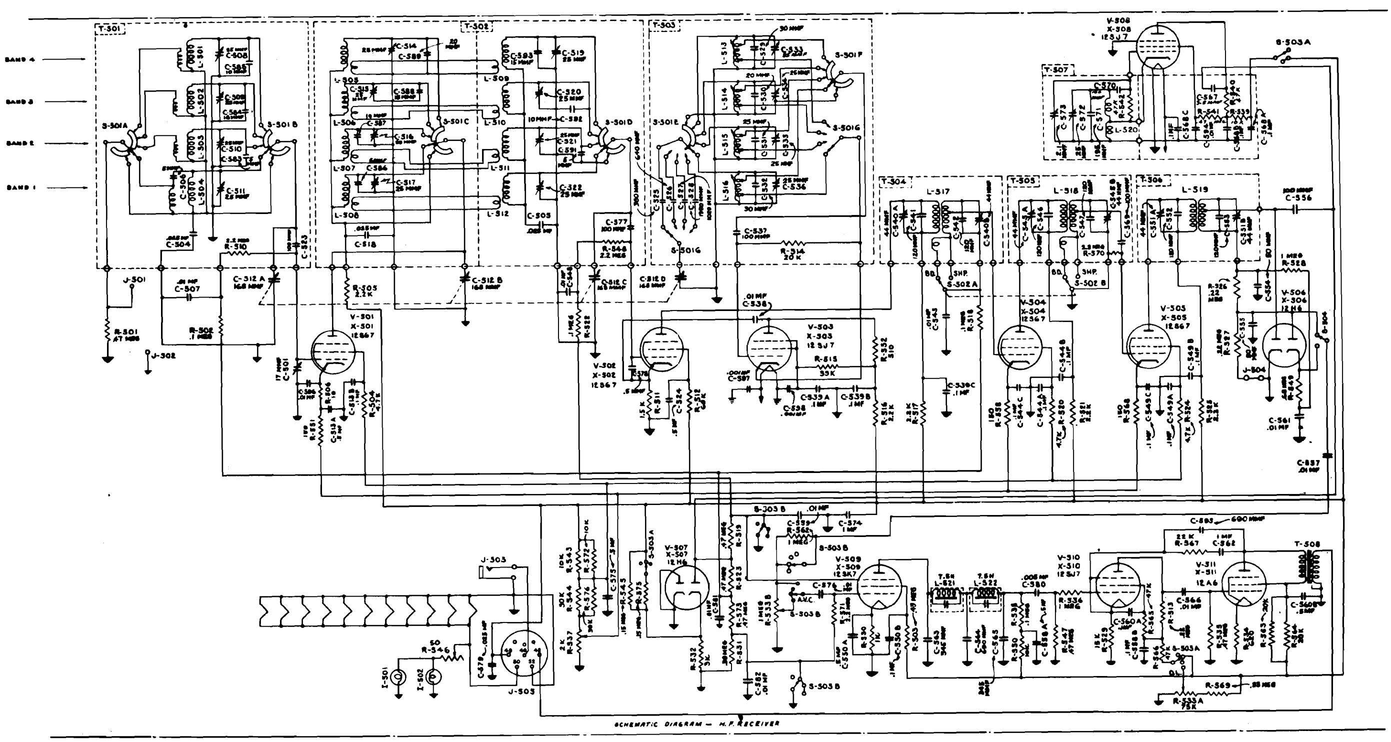
The RBL is a low frequency (15-600 kc) TRF receiver using a regenerative detector and similar in appearance to the NC-100 (RAO, RBH). The RBL has extremely sharp selectivity in both RF and audio services.



RBM

The RBM is a nomenclature covering two separate receivers, and their associated equipments. Essentially it is a high frequency (2-20 mc)receiver and a medium frequency receiver (200 to 2000 kc.). Both receivers are highly selective using 140 kc in the IF of the MF receiver and 1255 as the IF frequency in the HF unit.

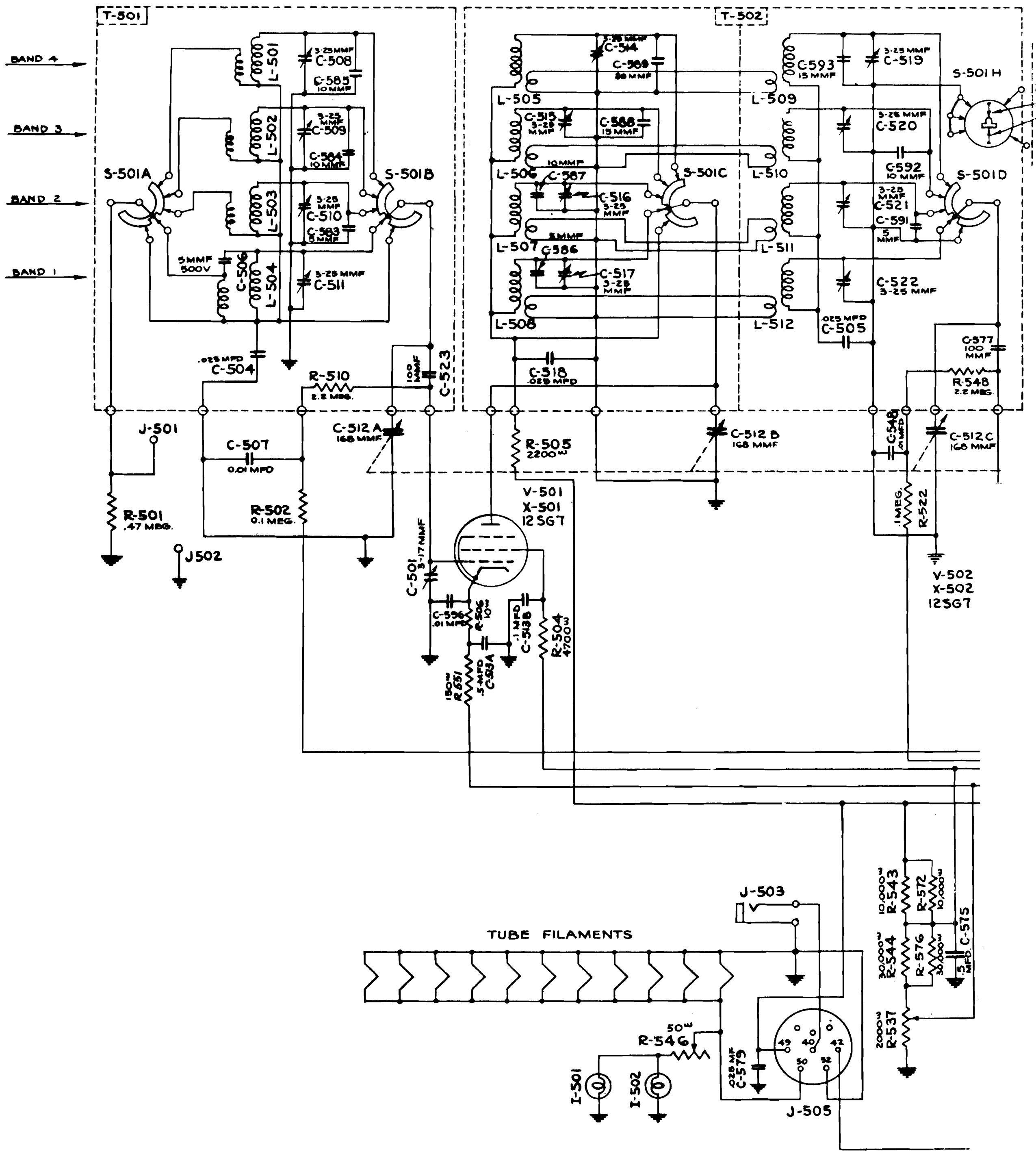
Each receiver incorporates AVC, BFO, noise limiter, antenna trimmer and headset output. No provision is made for loudspeaker operation. Both units are normally housed within a water-tight cannister which becomes an operating table. Normally the equipment is associated with the TBW transmitter. Power is provided either by means of a dynamotor and storage batteries or an AC supply. Power requirements are 190 to 225 volts at 75 ma. and 12.6 volts at 3 amperes.



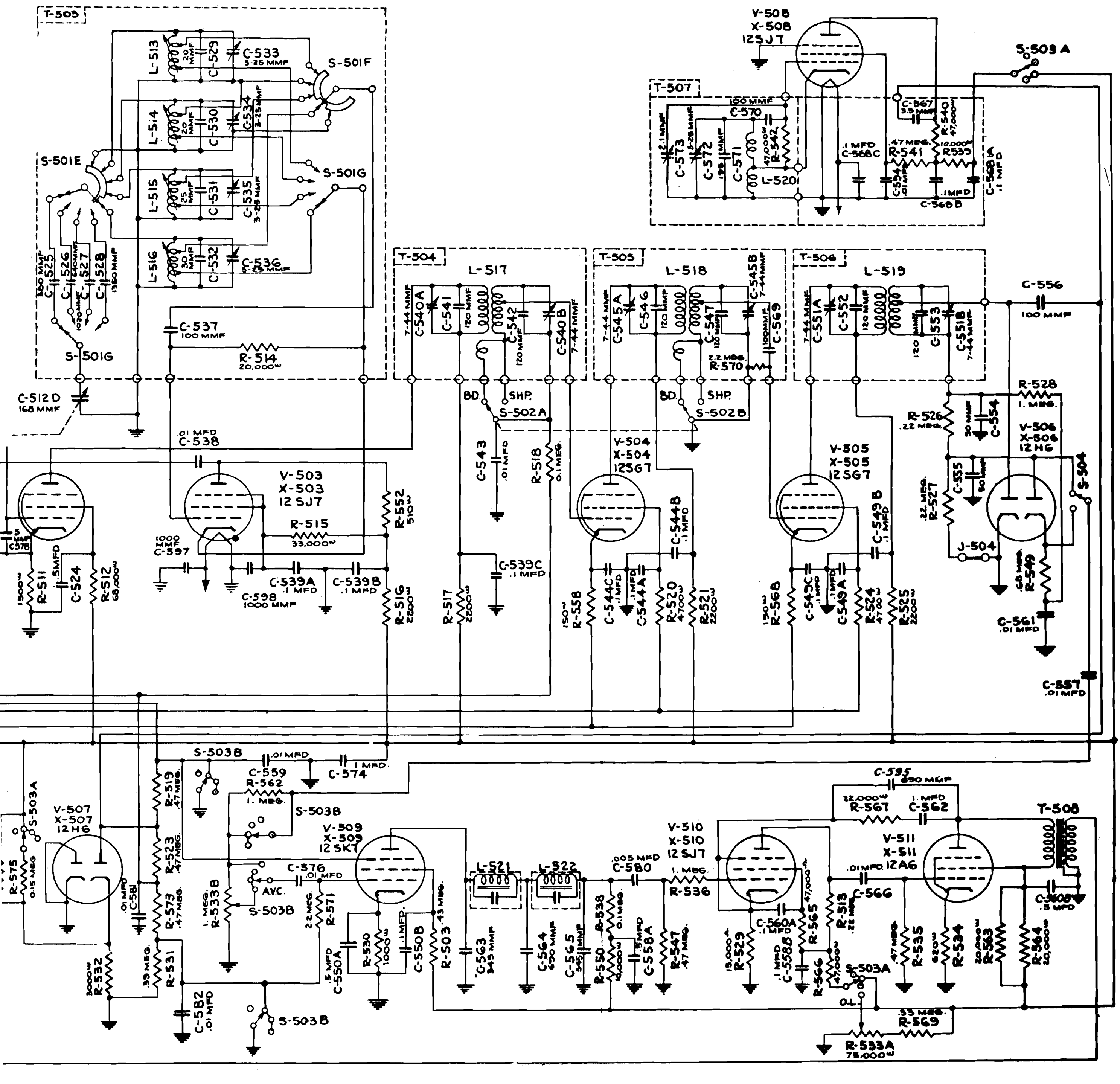
SCHEMATIC DIAGRAM — M.F. RECEIVER

RBS

The RBS receiver is a shipboard receiver covering the frequency band of 2.0 to 20.0 mc in four bands. It is capable of receiving both CW and voice AM and operates directly from 110v AC, from a separate power supply. The RBS employs both noise

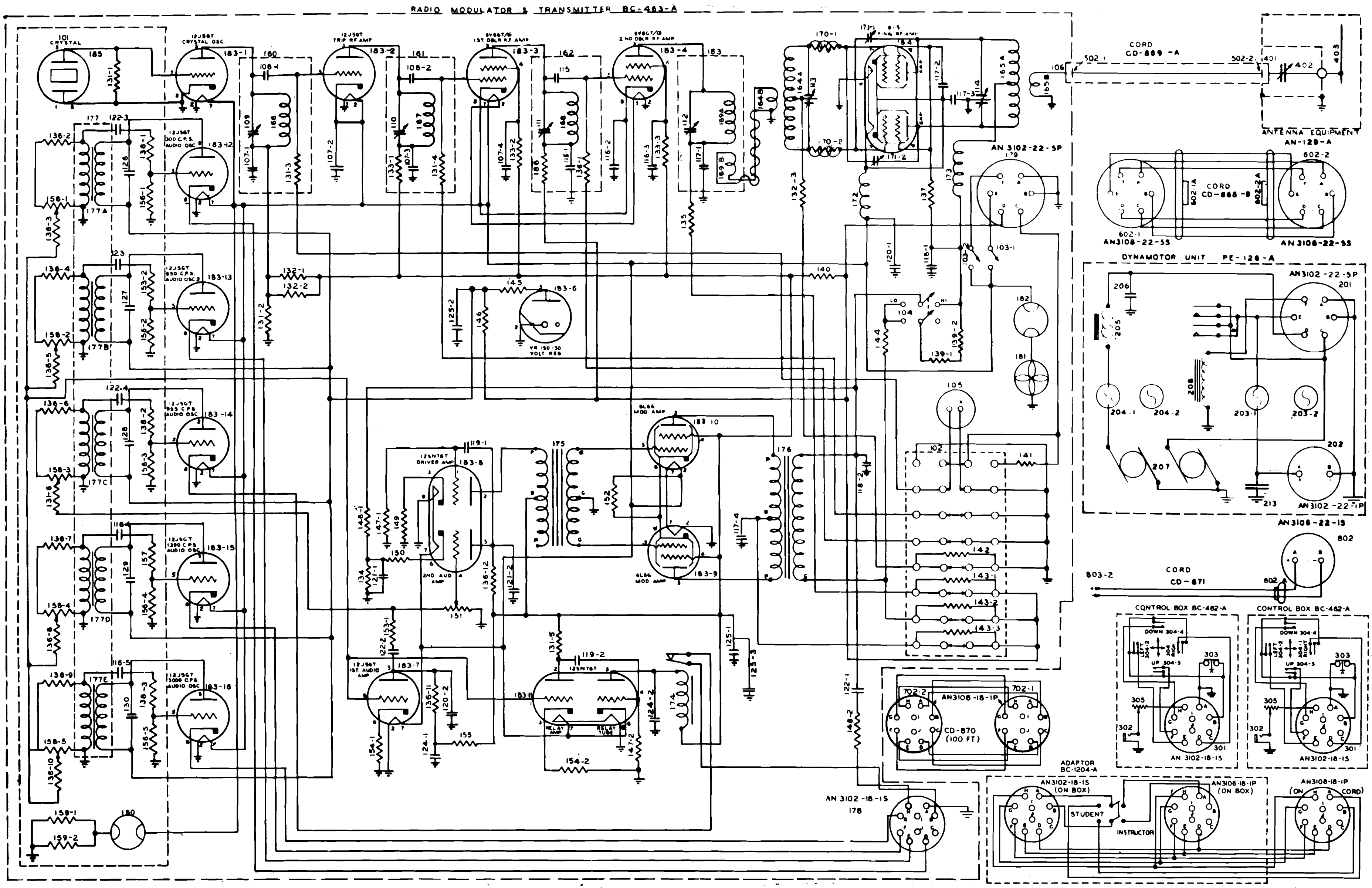


limiter and AVC, and features two positions of selectivity, broad and sharp. The intermediate frequency is 455 kc. A tuned filter is used in the audio stages to provide for additional selectivity.



RC-56

This is a 20 watt, 67-74 mc transmitter used for controlling pilotless aircraft.

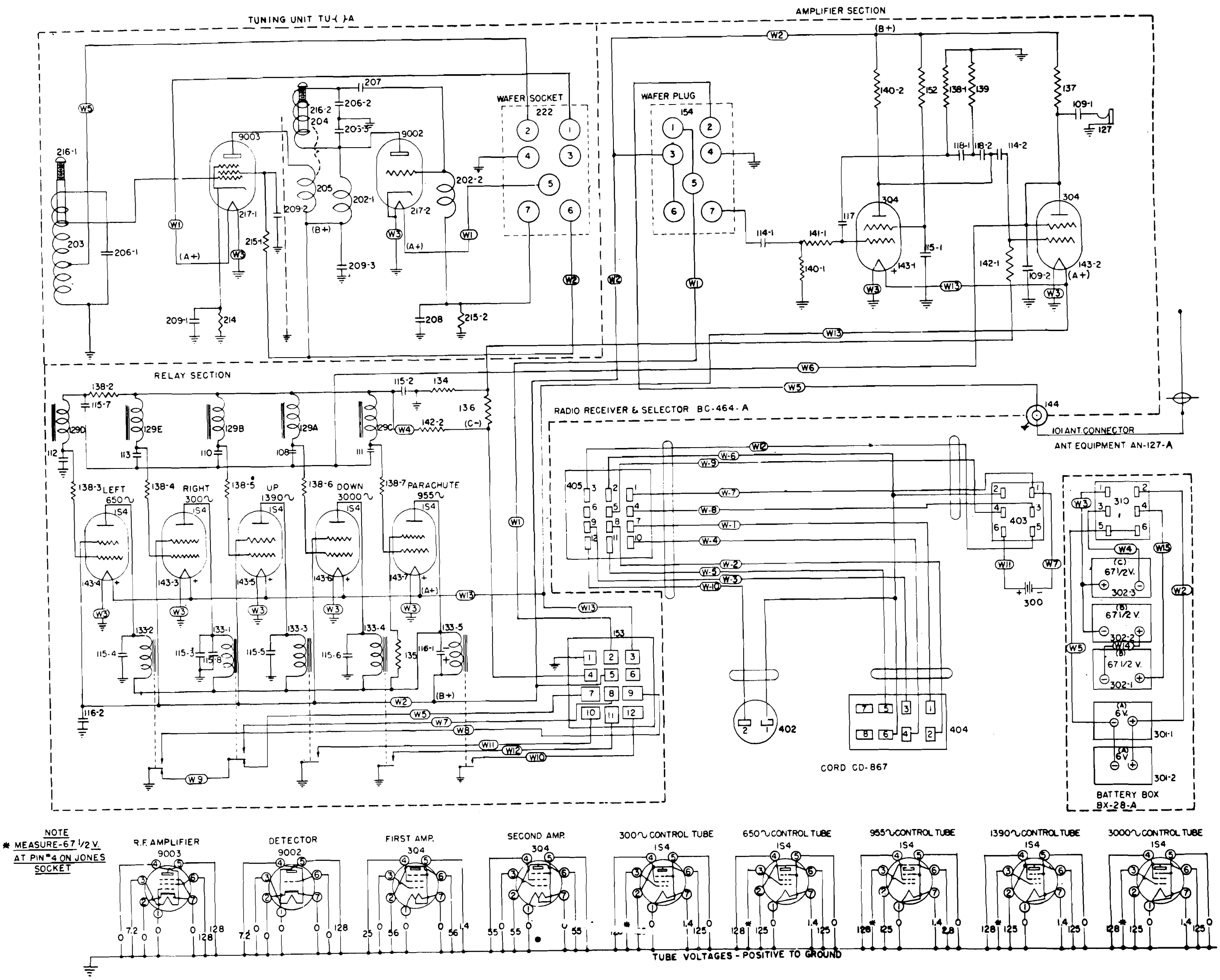


BC-57

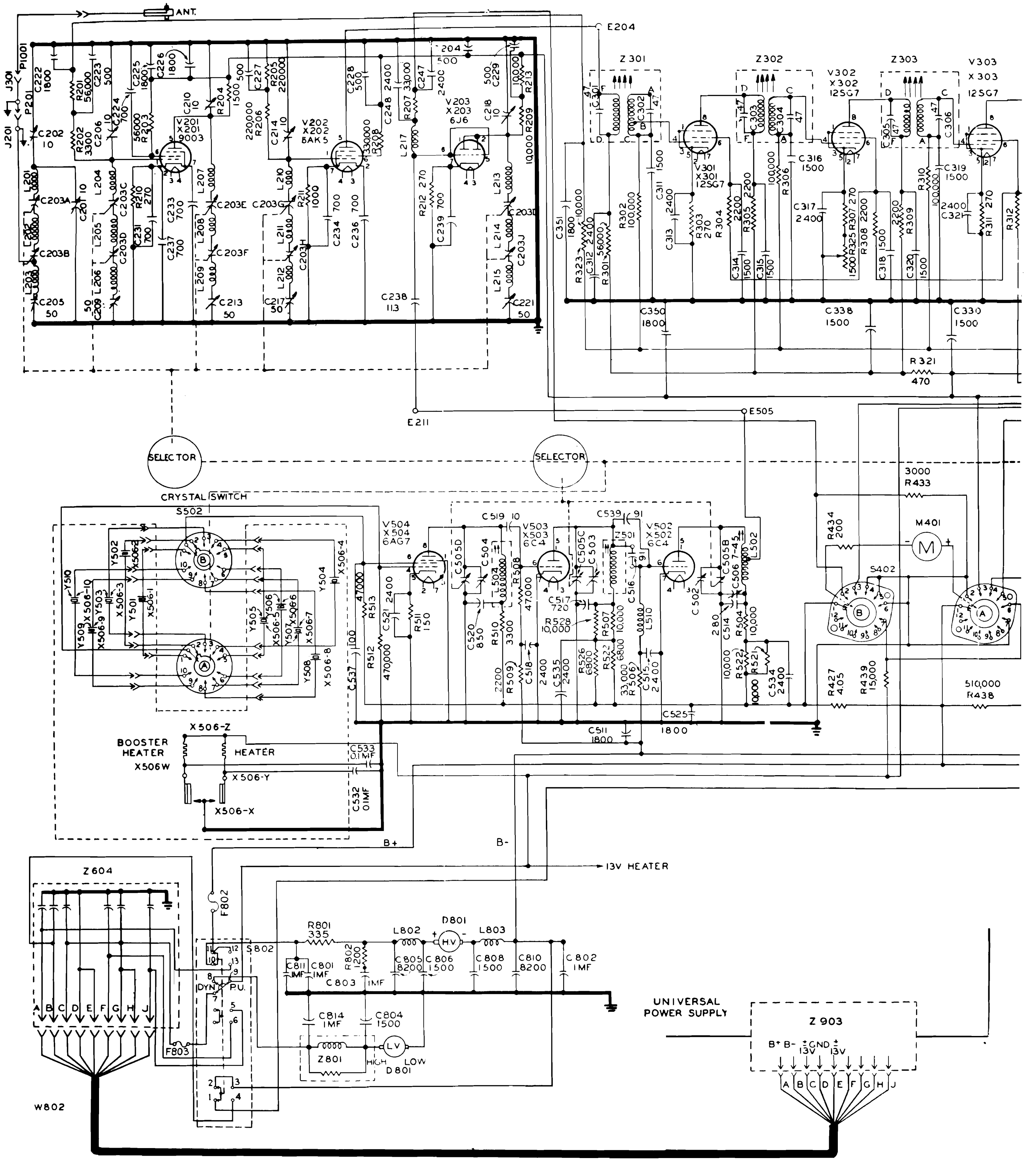
The RC-57 equipment is used to control the drone type pilotless aircraft when used for target purposes. It is a receiver, battery operated, with four audio tone channels, each supplying control signals for use within the aircraft control system. The equipment operates within the range of 68 to 73 mc and is preset to frequency prior to take-off. Operation from the dry battery supply is approximately 3 hours. Five tuning units are available,

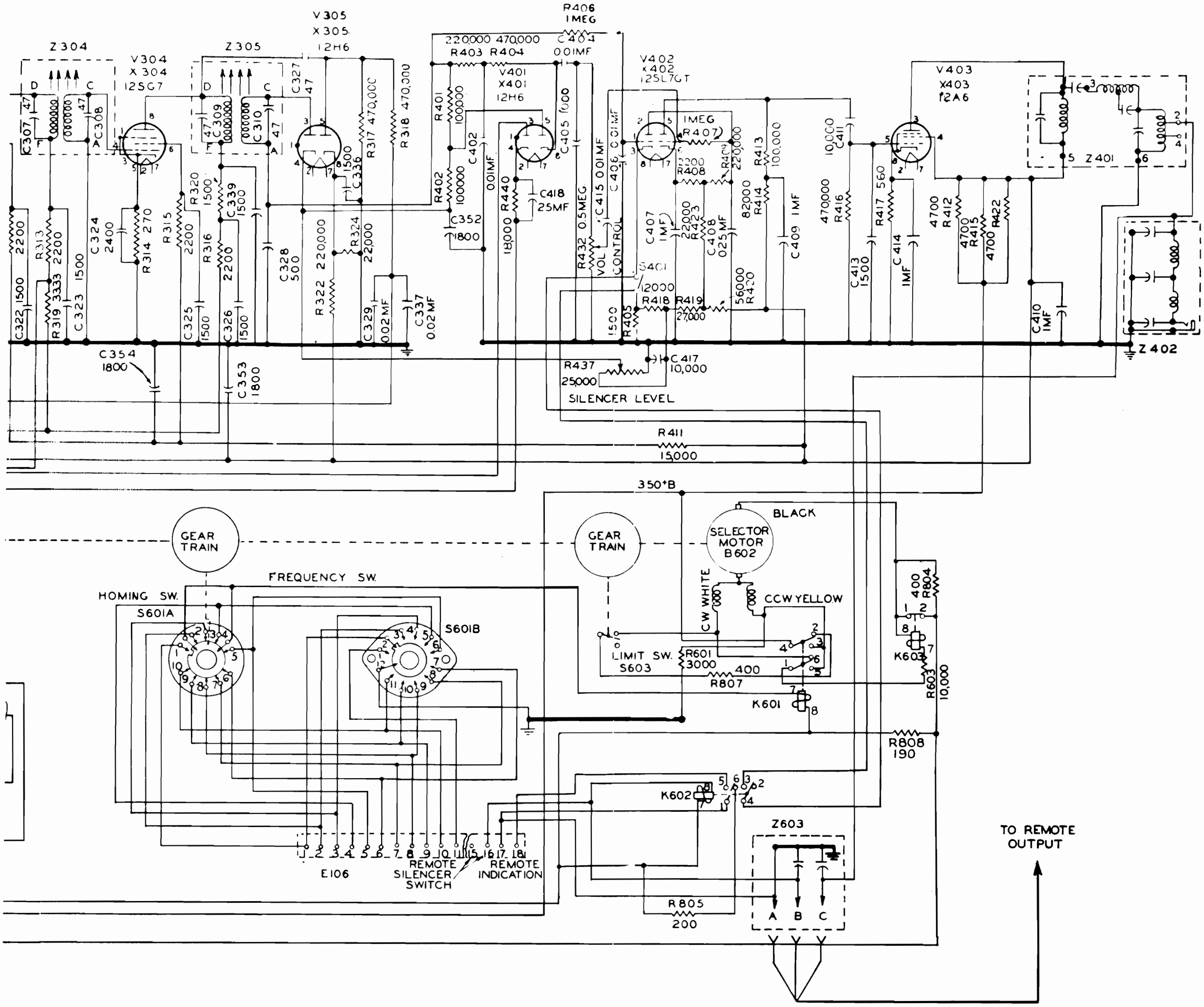
TU-41	73 mc
TU-43	71.3 mc
TU-44	69.6 mc
TU-45	68.0 mc
TU-55	68-73 mc

Power supplied to the receiver is obtained from dry cells



RC-57-A, Schematic Diagram Target Control Receiving Equipment


ANT.
E204
Z301
Z302
Z303
V302
X302
12SG7
V303
X303
12SG7
V201
X201
9003
V202
X202
6AK5
V203
X203
6J6
V301
X301
12SG7
C338
1500
C330
1500
C350
1800
R321
470
E211
E505
SELECTOR
SELECTOR
CRYSTAL SWITCH
S502
V504
X504
6AG7
V503
X503
6C4
V502
X502
6C4
Z501
3000
R433
M401
S402
510,000
R438
BOOSTER
HEATER
X506W
X506-Z
HEATER
X506-Y
X506-X
C533
0.1MF
C532
0.1MF
C511
1800
C525
1800
B+
B-
13V HEATER
Z604
F802
S802
R801
335
L802
D801
HV
L803
C805
8200
C806
1500
C808
1500
C810
8200
C802
1MF
C811
1MF
C801
1MF
C803
1MF
C814
1MF
C804
1500
Z801
LV
HIGH
LOW
D801
DYN
P.U.
F803
W802
UNIVERSAL
POWER SUPPLY
Z903
B+ B- GND 13V 13V
A B C D E F G H J

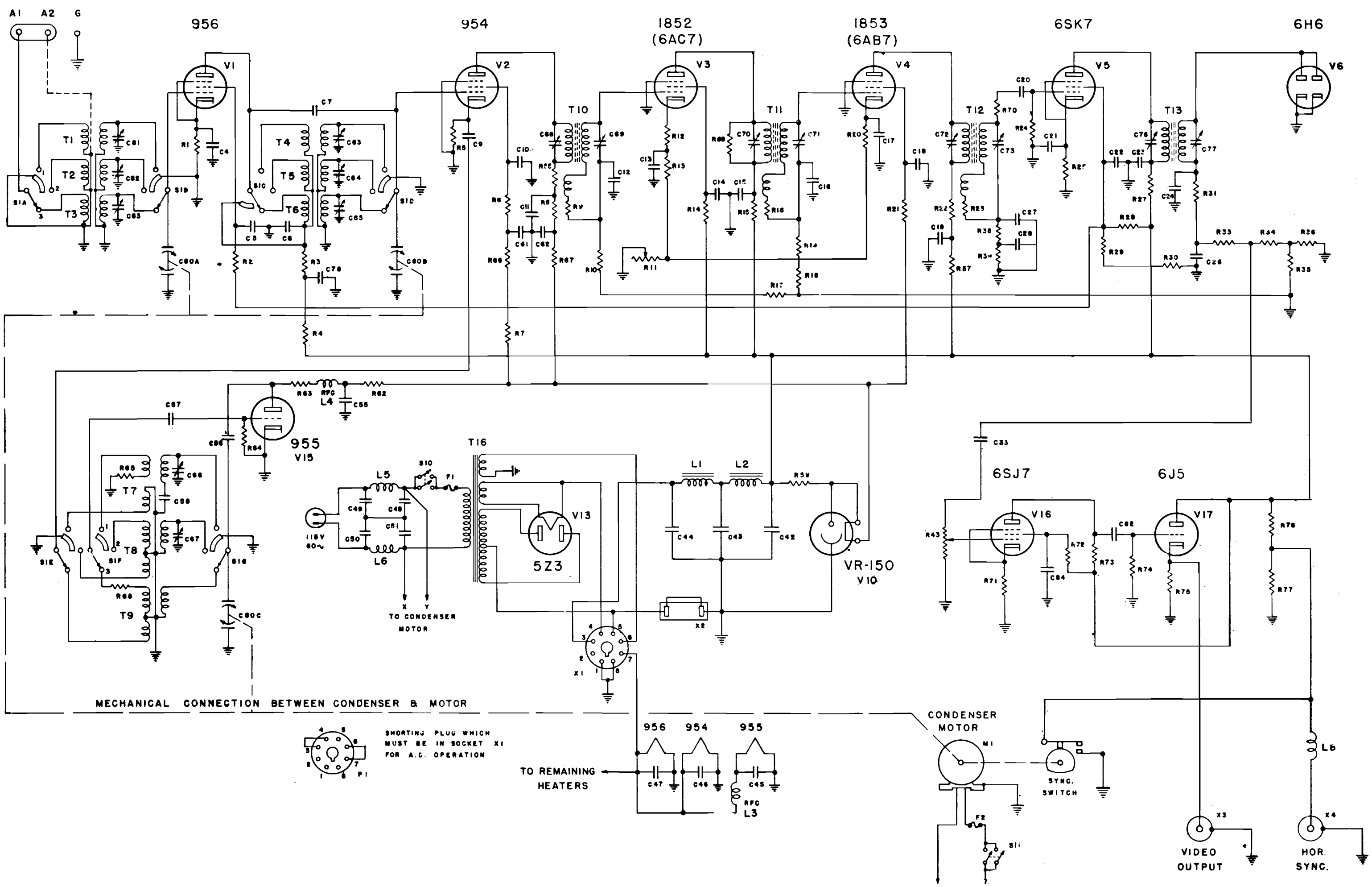


The Navy RDR is a VHF-UHF receiver covering the frequency range 225-390 mc. Originally part of the MAR equipment it may be used by itself as it is fully self contained. The receiver is a ten channel crystal superheterodyne capable of remote channel selection and operation. It includes a dynamotor enabling it to operate from a 13 volt dc supply. Some models were made for 24 volt systems as well. An external power supply may be used when desired.

The intermediate frequency of the receiver is 30.2 mc and the receiver circuits incorporate a noise limiter, AVC, squelch and other features. The crystal oscillator operates in the 4814.815 to 7777.778 kc range. Accessories include remote control devices and a gasoline generator. Many sectional RF stages were released to surplus, at the termination of the contract.

RDC

The RDC (Navy) is a receiver for panoramic reception over the frequency range of 28. 5 to 140 mc, in three bands. Presentation is provided to an external oscilloscope. Scanning the frequency range is accomplished by a motor drive rotating the tuning capacitor. The receiver is a superheterodyne with an IF of 5. 25 mc. The output is video, after detection, and this is then provided to the oscilloscope for presentation. Synchronization signals are provided for the oscilloscope, but the oscilloscope must provide its own sweep source. The sweep recurrance is 15 cps and this provides 15 complete band inspections every second. Power input is 115 volts 60 cycles



THE HAM SHOP

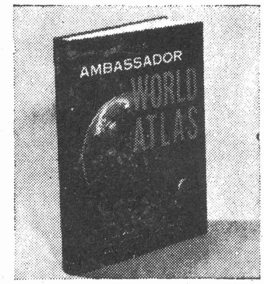


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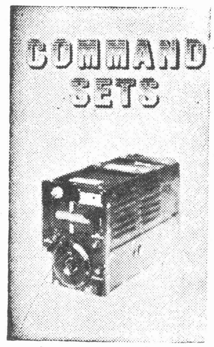
ATLAS

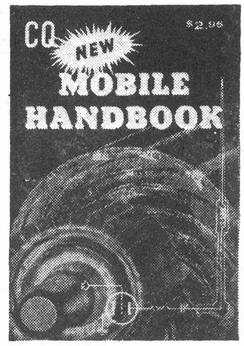
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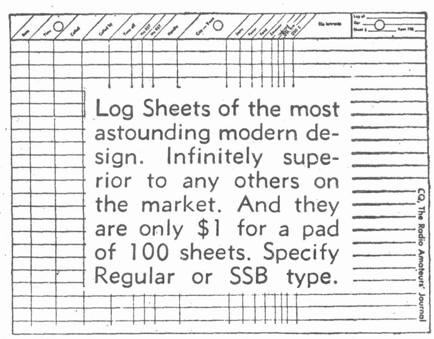
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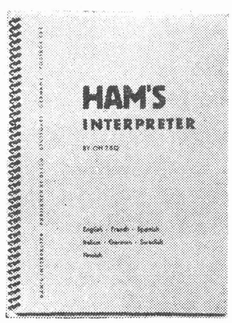
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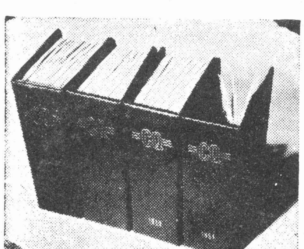
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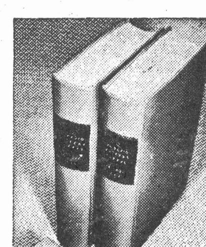


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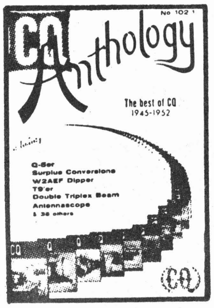
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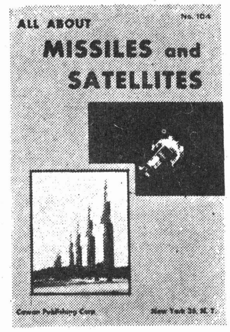
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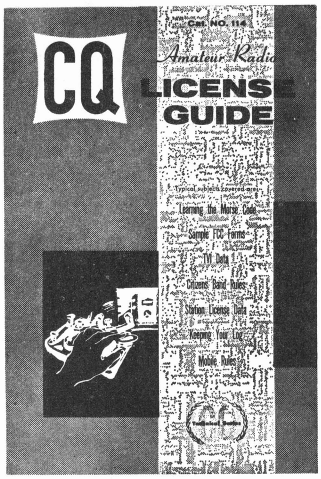
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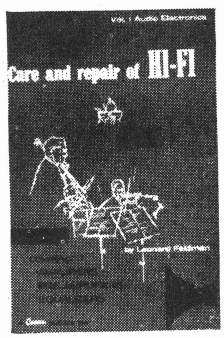


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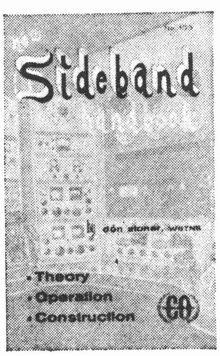
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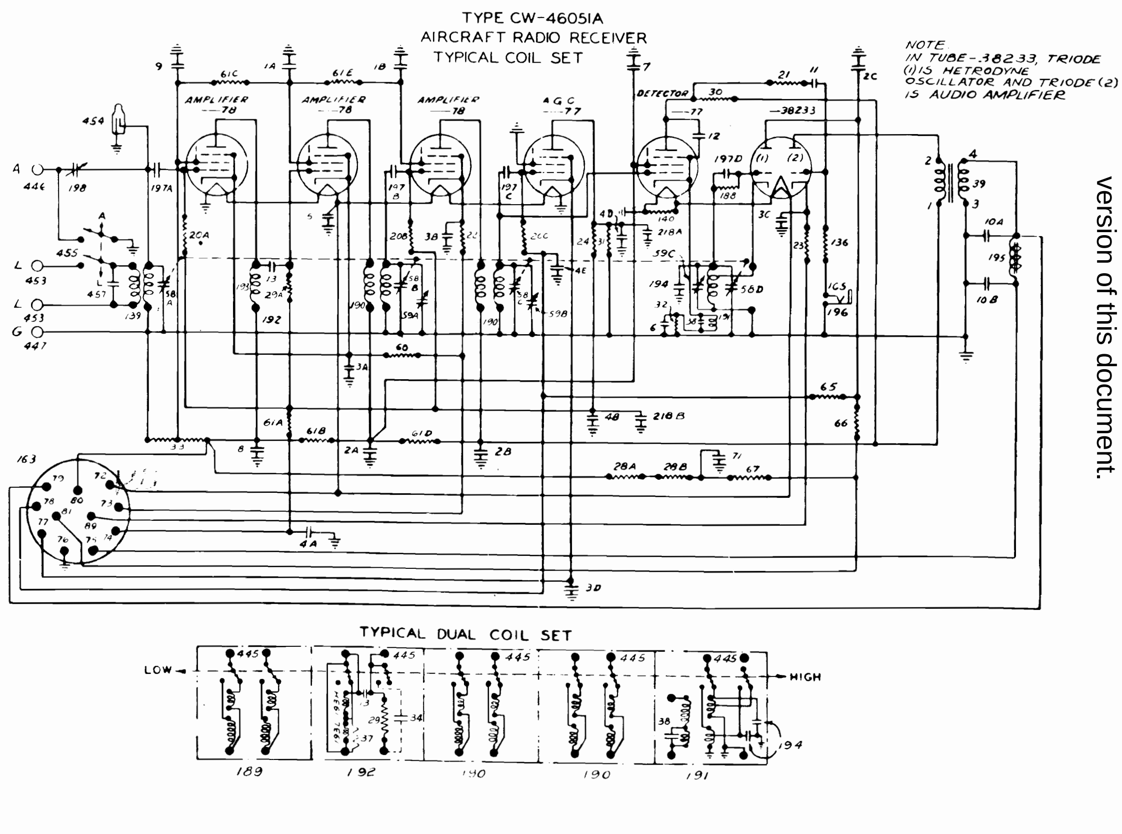
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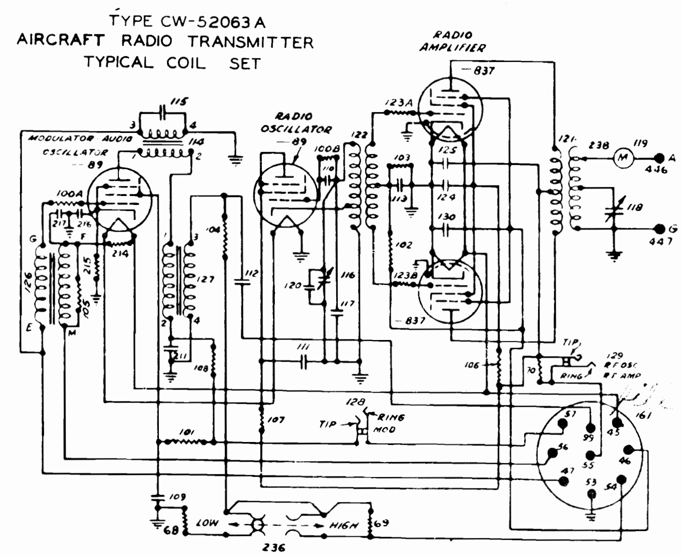
RU-4A/GF-3, RU-5A/GF-4, RU-7/GF-5 and RU-13/GF-8

Receiver coil sets of model RU-16 and RU-17 equipments are interchangeable with corresponding coil sets of the models RU-3, RU-3A, RU-4, RU-4A, RU-5, RU-5A, RU-6, RU-7, RU-10, RU-11, RU-12, RU-13 and RU-14. Corresponding units of the RU-17/GF are interchangeable with those of the model RU-14/GF-9.

The transmitter uses plug in coils for each band. The transmitter operates from a VFO and a calibration chart is supplied for each coil set. The receiver uses plug in coils although a dual band plug in coil box was also available.

The RU equipment was used in Naval aircraft for communications much as the ARC-5 equipment was, but wasn't as modern as the ARC-5 sets. The transmitters cover the frequency range of 2000 to 4523 kc and 6000 to 9050 kc. The receivers cover the frequency range of 195 to 13,575 kc. Transmission and reception is on voice, CW or MCW. The major differences in the equipments is the power supply input voltages. The RU-16 operates on 12 volts while the RU-17 operates on 24 volts dc. Corresponding dynamotors, control boxes and antenna relays are of a voltage appropriate to the system. The RU-16 can be identified by the use of a black nameplate, while the RU-17 uses blue nameplates. Corresponding units of the RU-16/GF-11 are interchangeable with the





ARC-5

This equipment is a multichannel aircraft communications equipment. Several different transmitters, receivers and accessories are provided to make the equipment extremely flexible. More amateur radio conversions have been accomplished on this equipment than on any other surplus yet available.

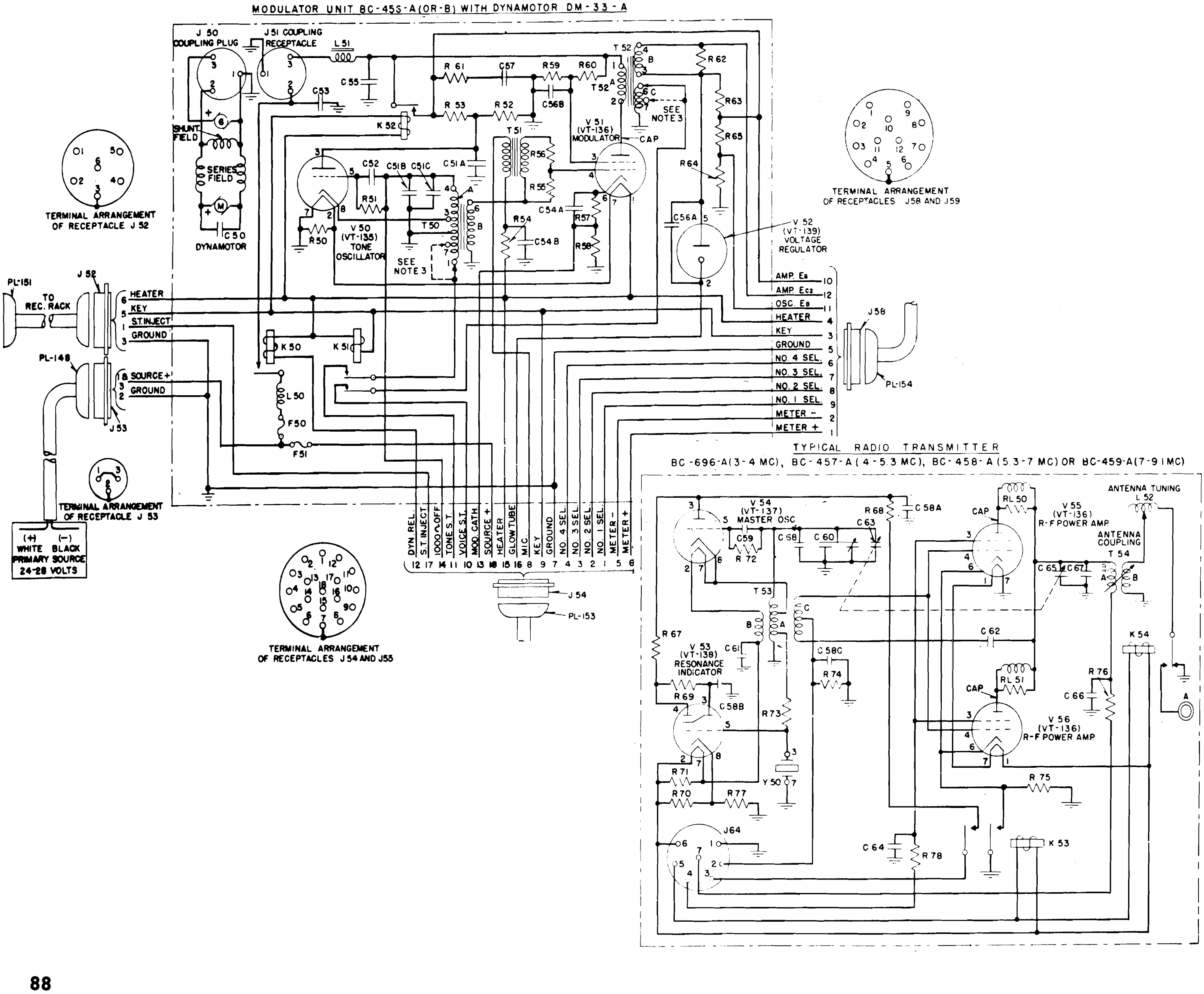
There are many different military designations for the units of SCR-274N, including: R-23, 24, 25, 26, 27, 28, 148, BC-453, 454, 455, 456, 457, 458, 459, 451, 696, 946, T-18, 19, 20, 21, 22, 23, MD7, DM-33, DY-8, C-29, RE-2. Many of these numbers may be followed by the letter A, B, C, D, etc.

Receiver audio output is designed to match 8000 ohm headsets. Receivers with a Bsuffix, also have 600 ohm output. When converting, it is usual to remove the adaptor box from the front panel and mount an Off-On switch, a volume control, a BFO switch and a phone jack in this space. All the connections for these are brought to the plug which mates with the adaptor box, greatly simplifying this operation.

Transmitters are capable of outputs up to 100 watts depending on the plate voltage used. The VFO units of this series are remarkably stable, and rival most commercial equipment. They also have a high degree of linearity, and have been widely used by amateurs for sideband applications.

Conversion of the transmitter and receiver units is covered, almost to the point of exhaustion, in the book "Command Sets" which sells for $1. 50.

MODULATOR UNIT BC-455-A (OR-B) WITH DYNAMOTOR DM-33-A



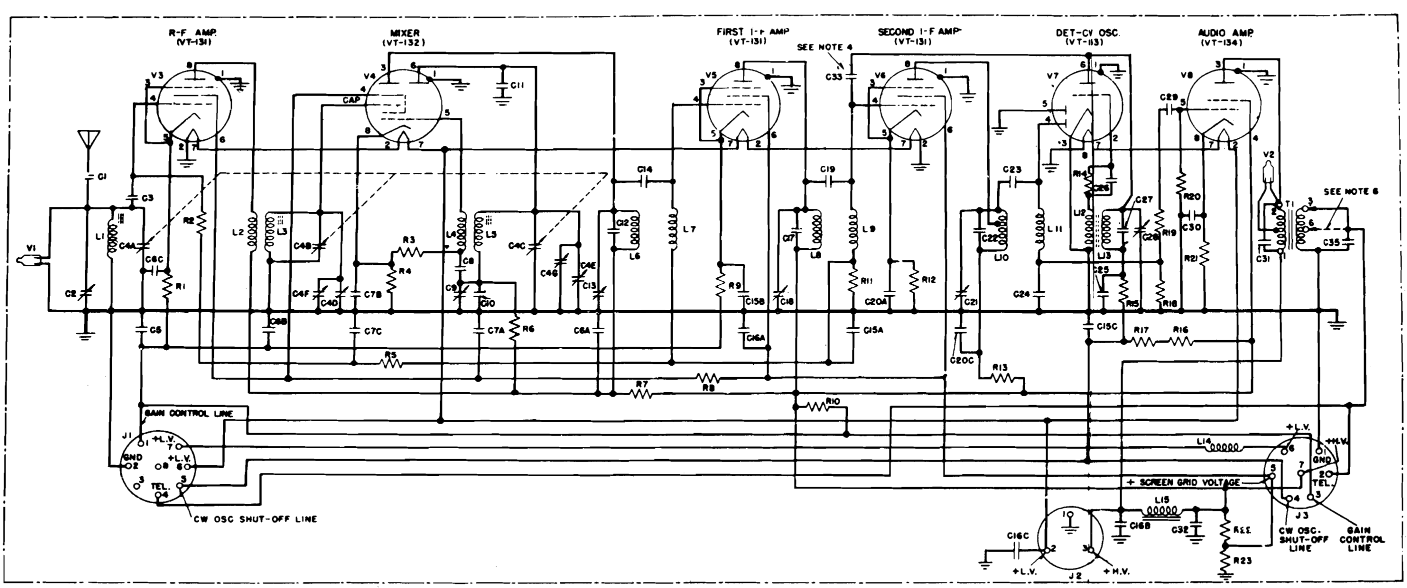
MD-7

The MD-7 uses a pair of 1625's to modulate any of the ARC-5 transmitters. It is almost completely unused by amateurs except as a source of parts, i. e. the modulation transformer can be quite handy.

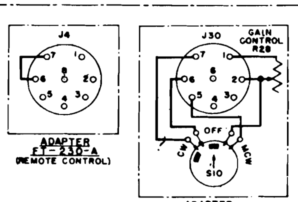
AN/ARC-5 (SCR-274N) Major Components

ARC-5 Nomenclature	SCR-274N Nomenclature	Frequency Band Megacycles	Function	Receiver I. F. Kilocycles
R-23/ARC-5	BC-453	0.190-0.550	Receiver	85
R-148/ARC-5	-------	0.190-0.550	Receiver	85
R-24/ARC-5	BC-946	0.520-1.500	Receiver	239
R-25/ARC-5	-------	1.500-3.000	Receiver	
R-26/ARC-5	BC-454	3.000-6.000	Receiver	1415
R-27/ARC-5	BC-455	6.000-9.100	Receiver	2830
R-28/ARC-5	-------	100.0-156.0	Receiver	
T-15/ARC-5	-------	0.500-0.800	Transmitter	
T-16/ARC-5	-------	0.800-1.300	Transmitter	
T-17/ARC-5	-------	1.300-2.100	Transmitter	
T-18/ARC-5	-------	2.100-3.000	Transmitter	
T-19/ARC-5	BC-696	3.000-4.000	Transmitter	
T-20/ARC-5	BC-457	4.000-5.300	Transmitter	
T-21/ARC-5	BC-458	5.300-7.000	Transmitter	
T-22/ARC-5	BC-459	7.000-9.100	Transmitter	
T-23/ARC-5	-------	100.0-156.0	Transmitter	

Radio Set SCR-274-N Receiving Equipment,
Schematic Circuit Diagram



TYPICAL RADIO RECEIVER BC-455-B (6-9.1 MC). I-F = 2830KC



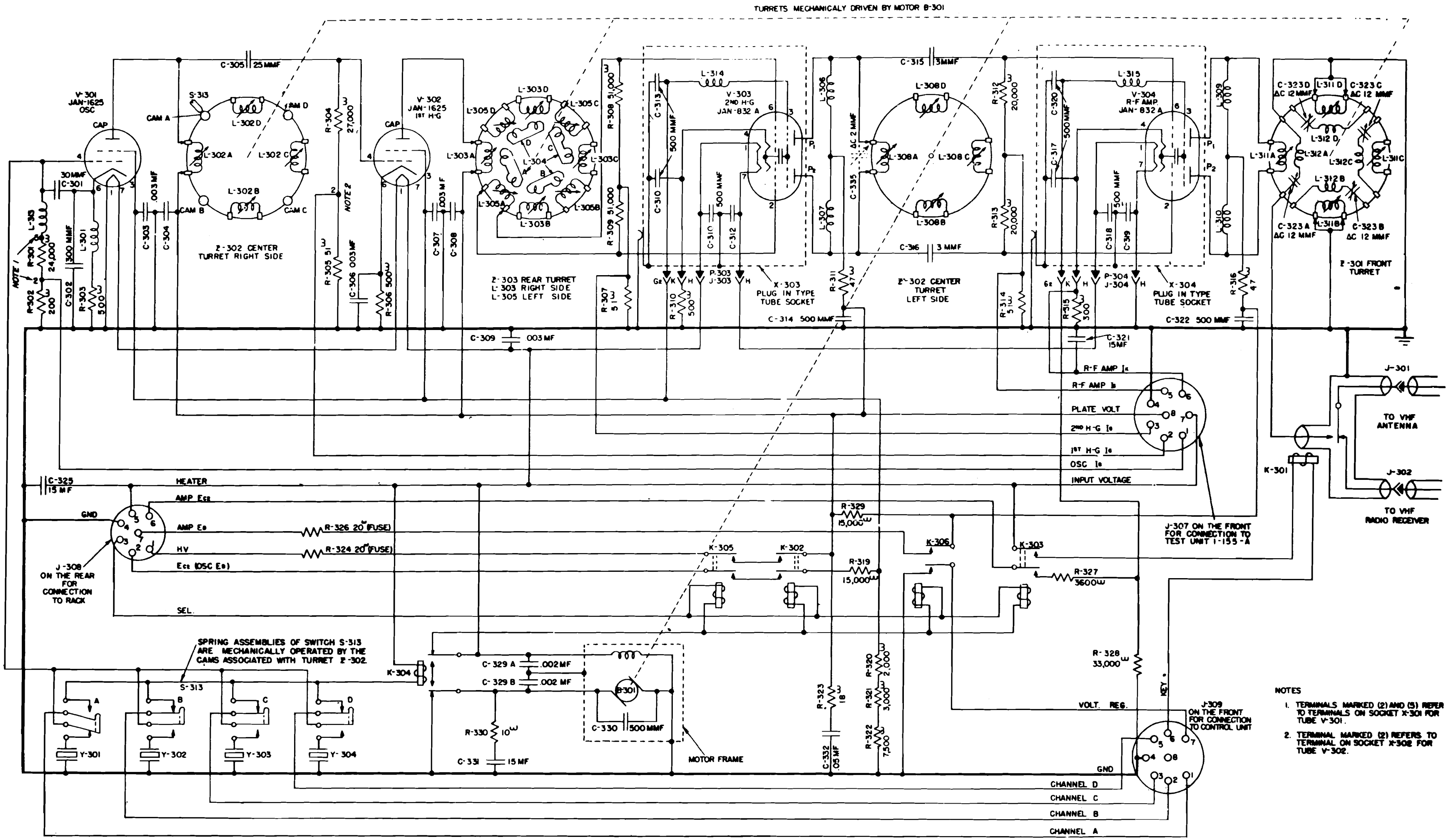
ADAPTER FT-230-A (REMOTE CONTROL)

ADAPTER FT-260-A (LOCAL CONTROL)

NOTES:
1. CAPACITOR ABBREVIATIONS
   MMF - MICROMICROFARADS
   MF - MICROFARADS
2. ALL PLUGS AND RECEPTACLES ARE SHOWN AS VIEWED FROM THE OUTSIDE.
3. ALL RELAYS ARE SHOWN IN THE NON-ENERGIZED POSITION.
4. THE CAPACITANCE BETWEEN PIN PLUGS IN THE 2ND I-F RECEPTACLE CONSTITUTES C-33.
5. TERMINAL NUMBERS APPEARING ON RECEPTACLES OF JACKS IN RECEIVERS AND ADAPTERS AND ALL CIRCUIT SYMBOLS ARE FOR REFERENCE PURPOSES ONLY THEY DO NOT APPEAR ON THE EQUIPMENT.
6. TRANSFORMER T1 IN BC-453-B, BC-454-B AND BC-455-B RECEIVERS IS PROVIDED WITH A TAP (TERM.6) FOR LOW IMPEDANCE HEADSETS. THESE THREE RECEIVERS AND RADIO RECEIVERS BC-453-A, BC-454-A AND BC-455-A ARE NORMALLY FURNISHED WITH CONNECTION SHOWN IN SOLID LINES FOR USE WITH HIGH IMPEDANCE (8000 OHMS) HEADSETS. RADIO RECEIVERS BC-453-B, BC-454-B, AND BC-455-B CAN BE CHANGED FOR USE WITH LOW IMPEDANCE HEADSETS BY REMOVING THE TWO WIRES ON TERMINAL 3 AND CONNECTING THEM TO TERMINAL 6 AS SHOWN IN DASHED LINES.

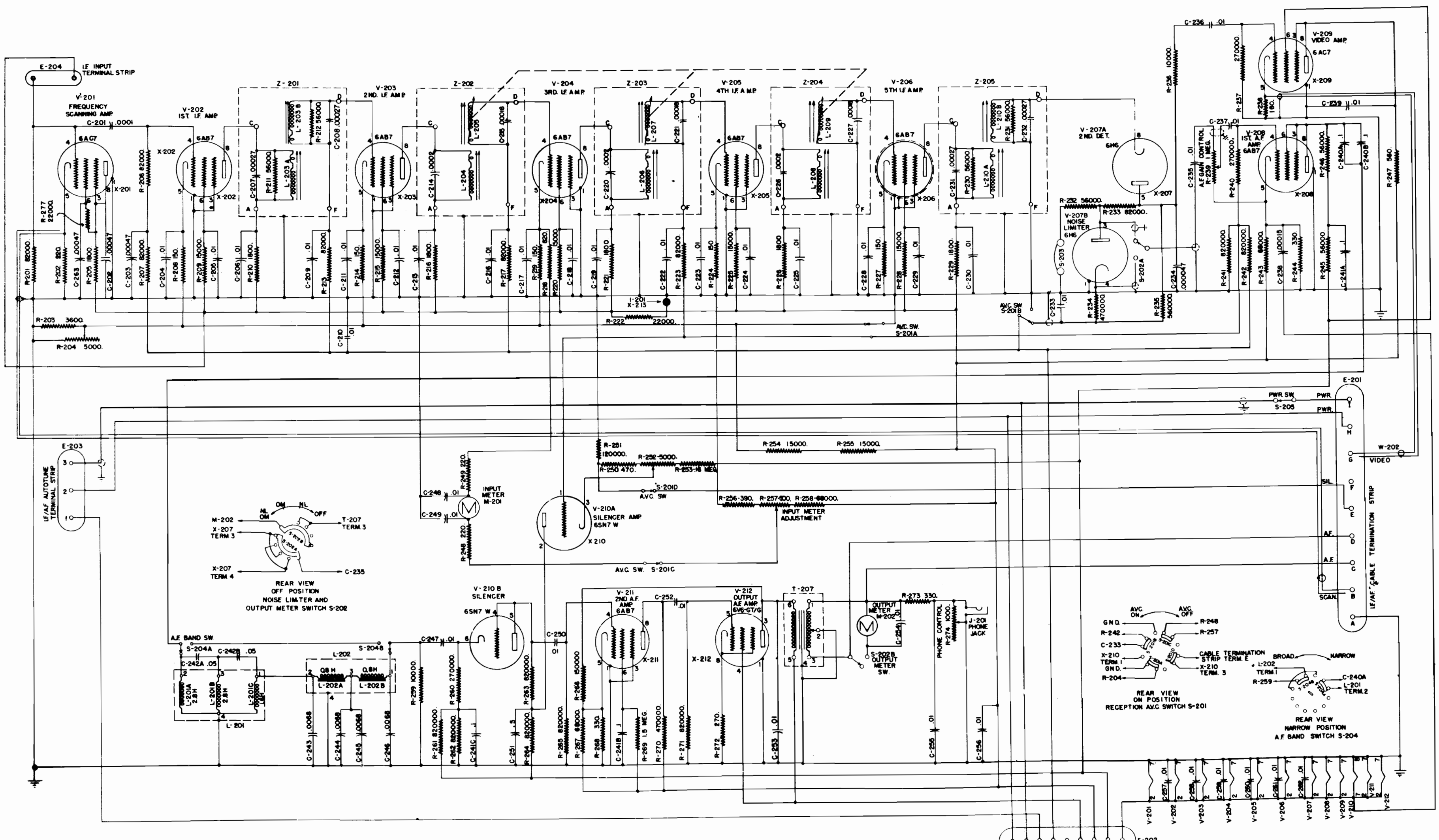
ARC-5 VHF Transmitter

The ARC-5 VHF Transmitter is easily converted for ham use on the two meter band. It can be operated with the automatic channel selection (4 channels). Enterprising amateurs have rewound some of the coils to provide a bandswitching transmitter for 10-6-2-1 1/4 meters.



RDZ

The RDZ is a 200-400 mc receiver originally used aboard ship. It features either manual tuning or ten channel autotune and operates from 110 VAC, 60 cycles AC. This unit is large, weighing in at about 200 lbs, and is a little antiquated for amateur UHF work. It has an IF of 15.5 mcs.



SCR-522

The SCR-522 and SCR-624 are very similar in components and can be considered for practical purposes, to be identical. The SCR-522 is primarily airborne. The equipment consists of several major components, the BC-624 receiver, the BC-625 transmitter and the power supply. They may be used independently or together. The frequency range is 100 to 156 mc. Reception is AM and four preset channels may be selected.

The receiver is a superheterodyne with a 12 mc IF. Operation is crystal controlled using 8 to 8.72 mc crystals. Conversion to 2 meters, tunable is covered in CQ, July, 1947. The receiver incorporates squelch as well as a noise limiter. AVC is employed as well. Audio output is taken from the output transformer, terminal 7 is 4000 ohms; terminal 6 is 300 ohms and terminal 5 is 50 ohms, with respect to ground.

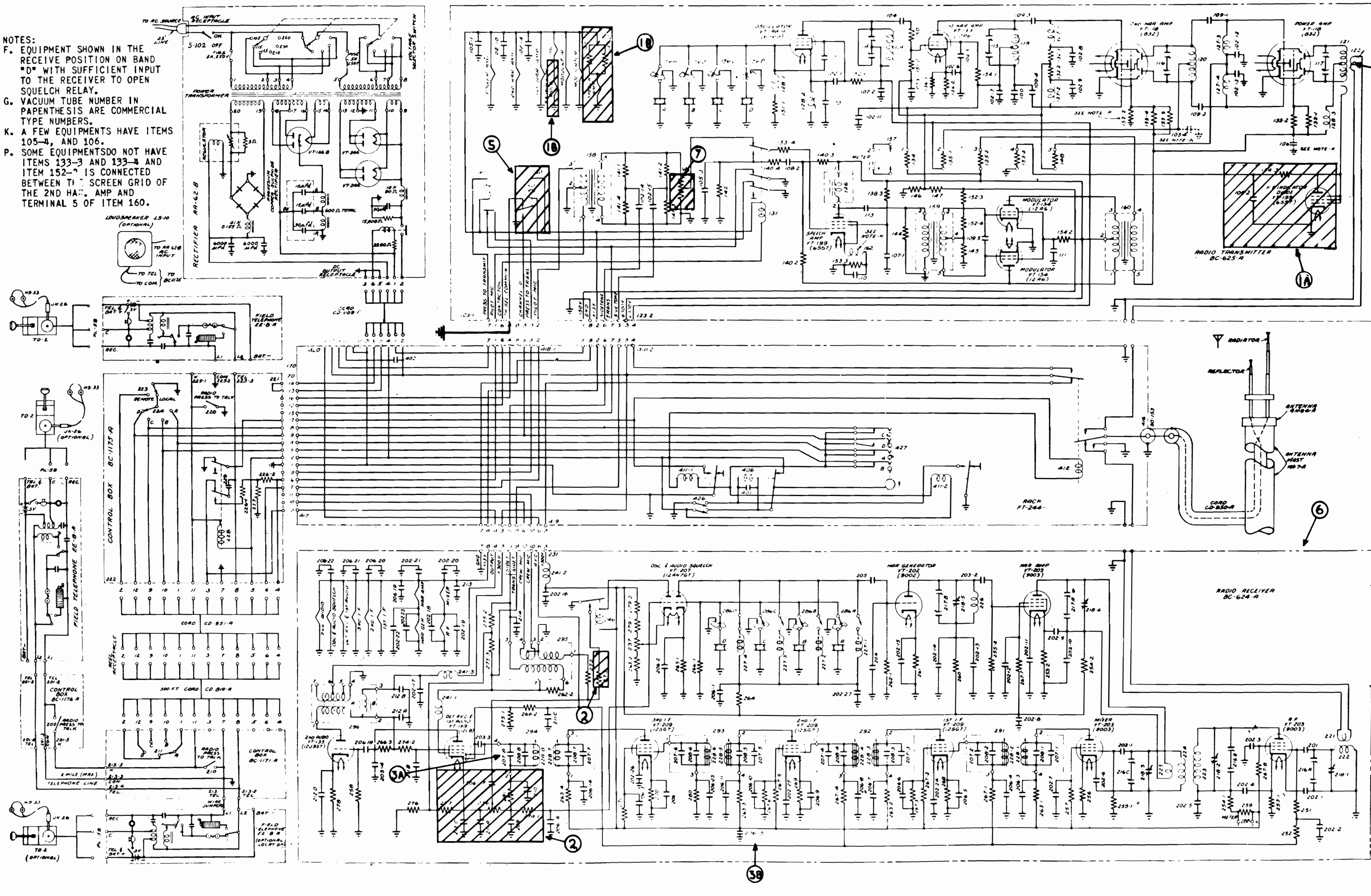
The transmitter is crystal controlled, four channels. Second harmonic of the crystal oscillator is fed to two stages of triplers and then to the final stage.

When the transmitter is mounted within the FT-244A rack a cam and shaft mechanism select the preset positions of both transmitter and receiver to accomplish tuning. An external meter is plugged in when tuning set-up is necessary.

Total power requirements are

310V	230 ma dc,	High voltage
150V (neg)	8 ma dc,	Bias
12.6V	3.5 amp,	filament
13 volts	0.5 amp dc	relay and motor

Accessories include the BC-1175A control box, the BC-1171A control box, the BC-1176A control box, the PE-94A 24 volt power supply, the PE-98A 12 volt power supply BC-602 control box and many more. The AC supply is designated RA-62.



NOTES:

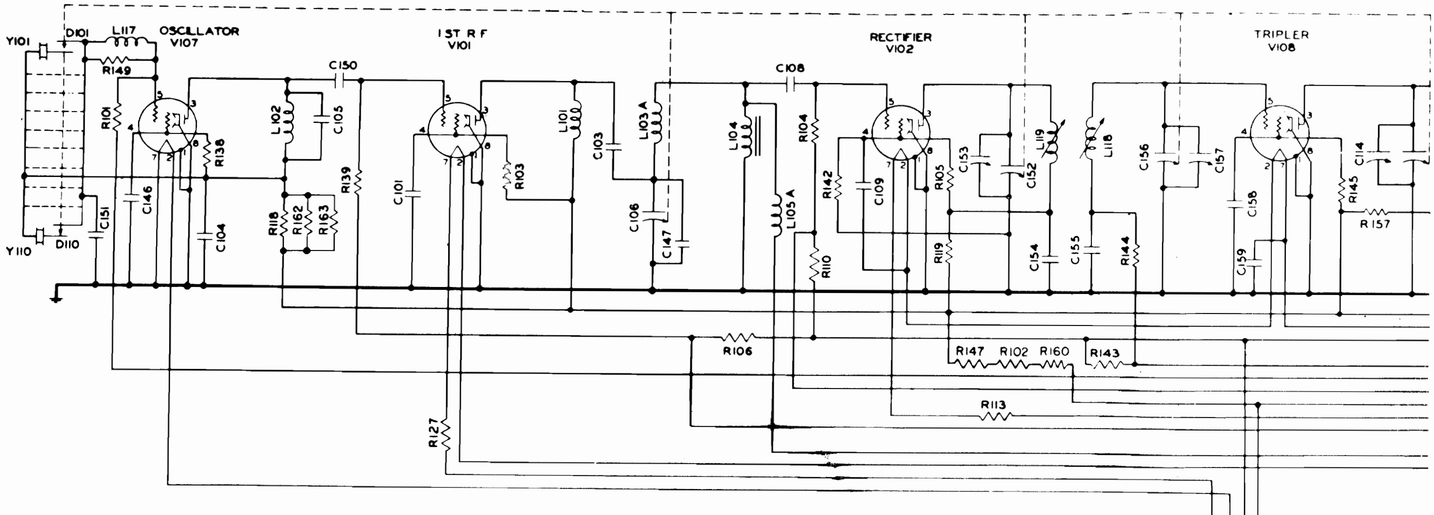
F. EQUIPMENT SHOWN IN THE RECEIVE POSITION ON BAND "D" WITH SUFFICIENT INPUT TO THE RECEIVER TO OPEN SQUELCH RELAY.

G. VACUUM TUBE NUMBER IN PAPENTHESIS ARE COMMERCIAL TYPE NUMBERS.

K. A FEW EQUIPMENTS HAVE ITEMS 105-4, AND 106.

P. SOME EQUIPMENTSDO NOT HAVE ITEMS 133-3 AND 133-4 AND ITEM 152-? IS CONNECTED BETWEEN T?? SCREEN GRID OF THE 2ND HAR. AMP AND TERMINAL 5 OF ITEM 160.

The SCR-608A and SCR-628A are basically the same equipment. They operate from 27 to 38.9 mc and are calibrated every 100 kc. They operate on FM or CW. The receivers are tunable, but the transmitters are crystal controlled. Ten preset channels are available. The receiver IF is 2.65 mc. They operate on 12 or 24 volts dc and have a loudspeaker built into the receiver. The



APPARATUS LEGEND

RADIO TRANSMITTER BC-684-A

CAPACITORS

C 101	0.003 UF 800 V
C 103	100 UUF 800 V
C 104	500 UUF 800 V
C 105	15 UUF 500 V
C 106 (GANGED)	350 UUF MAX-AIR GAP 0.025"
C 113 (GANGED)	60 UUF MAX-AIR GAP 0.025"
C 115 (GANGED)	60 UUF MAX-AIR GAP 0.025"
C 119 (GANGED)	80 UUF MAX-AIR GAP 0.025"
C 152 (GANGED)	60 UUF MAX-AIR GAP 0.025"
C 156 (GANGED)	60 UUF MAX-AIR GAP 0.025"
C 108	500 UUF 800 V
C 109	0.003 UF 800 V
C 111	0.003 UF 800 V
C 112	0.003 UF 800 V
C 114	20 UUF MAX-AIR GAP 0.025"
C 116	20 UUF MAX-AIR GAP 0.025"
C 117	0.003 UF 800 V
C 118	0.003 UF 800 V
C 120	20 UUF MAX-AIR GAP 0.025"
C 121	0.003 UF 800 V
C 122	0.003 UF 800 V
C 123	0.01 UF 300 V
C 124	0.002 UF 1200 V
C 125	60 UUF MAX-AIR GAP 0.030"
C 126	20 UUF MAX-AIR GAP 0.025"
C 127	100 UUF MAX-AIR GAP 0.0195"
C 128	100 UUF MAX-AIR GAP 0.0195"
C 129	100 UUF MAX-AIR GAP 0.0195"
C 130	100 UUF MAX-AIR GAP 0.0195"
C 131	100 UUF MAX-AIR GAP 0.0195"
C 132	100 UUF MAX-AIR GAP 0.0195"
C 133	100 UUF MAX-AIR GAP 0.0195"
C 134	100 UUF MAX-AIR GAP 0.0195"
C 135	100 UUF MAX-AIR GAP 0.0195"
C 136	100 UUF MAX-AIR GAP 0.0195"
C 137	0.5 UF 600 V
C 138.1	0.1 UF 600 V
C 138.2	0.1 UF 600 V
C 139	0.5 UF 600 V
C 140	30 UF 50 V
C 141	0.5 UF 600 V
C 142.1	0.1 UF 600 V
C 142.2	0.1 UF 600 V
C 143	0.5 UF 600 V
C 145	2 UF 1000 V
C 146	0.003 UF 800 V
C 147	175 UUF 800 V
C 148	0.003 UF 800 V
C 149	0.001 UF 1200 V
C 150	0.001 UF 800 V
C 151	50 UUF 800 V
C 153	20 UUF MAX-AIR GAP 0.025"
C 154	0.003 UF 800 V
C 155	0.003 UF 800 V
C 157	20 UUF MAX-AIR GAP 0.025"
C 158	0.003 UF 800 V
C 159	0.01 UF 300 V
C 161	100 UUF 800 V
C 162	4 UF 50 V
C 164	0.003 MF 800 V

SWITCHES

D 101 TO D 110	PUSH BUTTON ASSEMBLY CRYSTAL SELECTORS
D 111 TO D 120	PUSH BUTTON ASSEMBLY ANT CAP SELECTORS
D 121	ANT CUR-TUNE
D 122	RECEIVER TUNE-OPERATE
D 124	ON-OFF POWER SUPPLY
D 125	METER SWITCH
D 126	TANK-OTHER USE SWITCH

LAMP

E 101	PILOT LAMP

FUSE

F 101	1/2 AMPERE FUSE

JACKS

J 101	MAGNETIC MICROPHONE
J 102	CARBON MICROPHONE

COILS

L 101	1ST RF PLATE CHOKE
L 102	OSC PLATE
L 103A	1ST RF PLATE TUNING
L 104	MODULATION
L 105A	RF CHOKE
L 106	TRIPLER PLATE TUNING
L 107	DOUBLER GRID TUNING
L 108	DOUBLER PLATE TUNING
L 110	POWER AMP TUNING
L 111	ANTENNA COUPLING
L 117	OSC GRID FILTER
L 118	TRIPLER GRID TUNING
L 119	RECTIFIER PLATE TUNING
L 120	POWER AMP RF CHOKE
L 121	POWER AMP RF GRID CHOKE
L 122	POWER AMP ANTI-SING
L 123	FILAMENT CHOKE

METER

M 101	ANT CUR-TUNE METER

POTENTIOMETER

P101	50,000 Ω SIDETONE CONTROL

PLUGS

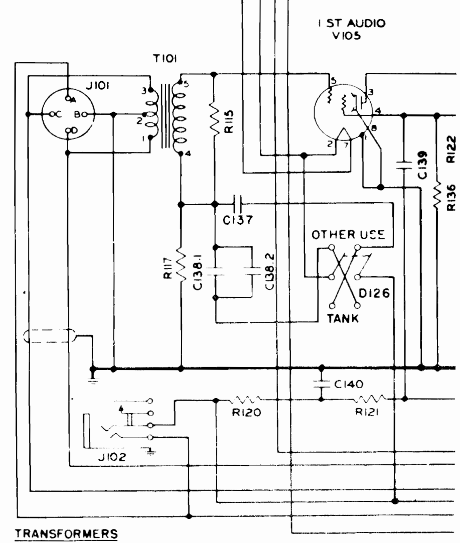
PG 101	TRANSMITTER
PG 103	DYNAMOTOR
PG 104	DYNAMOTOR

RESISTORS

R 101	100,000 Ω 1/2 W
R 102	667 Ω 25 W
R 103	250,000 Ω 1 W
R 104	70,000 Ω 1/2 W
R 105	50,000 Ω 1/2 W
R 106	100 Ω 1/2 W
R 107	30,000 Ω 1 W
R 108	30 Ω 1/2 W
R 109	75,000 Ω 2 W
R 110	1,000 Ω 1/2 W
R 111	30,000 Ω 1 W
R 112	10 Ω 1/2 W
R 113	1.0 Ω 10 W
R 114	30,000 Ω 2 W
R 115	100,000 Ω 1/2 W
R 116	30,000 Ω 2 W
R 117	50,000 Ω 1/2 W
R 118	100,000 Ω 2 W
R 119	1,200 Ω 1/2 W
R 120	200 Ω 1 W
R 121	100 Ω 1/2 W
R 122	250,000 Ω 1 W
R 123	10,000 Ω 1 W
R 124	10,000 Ω 1/2 W
R 125	5,000 Ω 1/2 W
R 126	75,000 Ω 2 W
R 127	1.0 Ω 10 W
R 128	10,000 Ω 1/2 W
R 129	5,000 Ω 25 W
R 130	100 Ω 10 W
R 131	12 Ω 25 W
R 132	12 Ω 25 W
R 133	80 Ω 10 W
R 134	30,000 Ω 1/2 W
R 135	30 Ω 10 W
R 136	30,000 Ω 1/2 W
R 137	100 Ω 1/2 W
R 138	50,000 Ω 1/2 W
R 139	100,000 Ω 1/2 W
R 140	12 Ω 25 W
R 141	12 Ω 25 W
R 142	180,000 Ω 1 W
R 143	100 Ω 1/2 W
R 144	100,000 Ω 1/2 W
R 145	50,000 Ω 2 W
R 147	667 Ω 25 W
R 149	50 Ω 1/2 W
R 151	100,000 Ω 1 W
R 153	8.3 Ω 17.9 W
R 154	8.3 Ω 17.9 W
R 155	100,000 Ω 1/2 W
R 156	30 Ω 1 W
R 157	300 Ω 1 W
R 158	50 Ω 1/2 W
R 159	100,000 Ω 1 W
R 160	667 Ω 25 W
R 161	30,000 Ω 1 W
R 162	100,000 Ω 2 W
R 163	100,000 Ω 2 W

RELAYS

S101	ANTENNA SWITCHING
S102	DYNAMOTOR STARTING
S103	RECEIVER DISABLING



TRANSFORMERS

T 101	AF INPUT
T 102	AF OUTPUT

THERMOCOUPLE

TC 101	ANT CUR THERMOCOUPLE

THERMOSTAT

TD 101	OVEN THERMOSTAT

VACUUM TUBES

V 101	VT-164 (1619)
V 102	VT-164 (1619)
V 103	VT-164 (1619)
V 104	VT 165 (1624)
V 105	VT-164 (1619)
V 106	VT-164 (1619)
V 107	VT-164 (1619)
V 108	VT-164 (1619)

CRYSTAL HOLDERS

Y 101 TO Y 110	CRYSTAL HOLDERS FT-241-D

DYNAMOTOR DM-35-

CAPACITORS

C 501	0.003 UF
C 502	0.003 UF

JACKS

J 501	DYNAMOTOR
J 502	DYNAMOTOR

DYNAMOTOR DM-37-

CAPACITORS

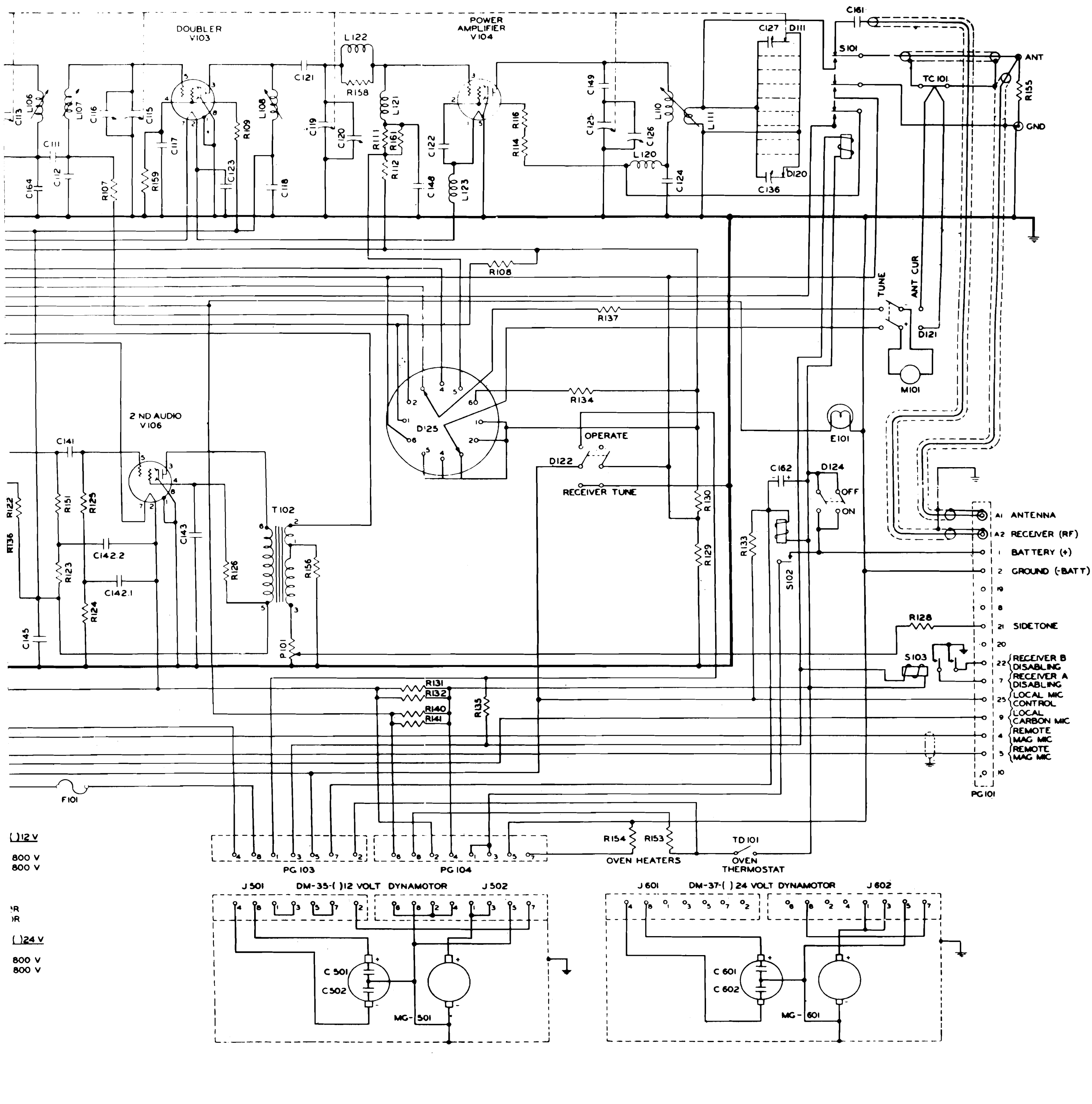
C 601	[illegible]
C 602	0.003 UF

JACKS

J 601	DYNAMOTO
J 602	DYNAMOTO

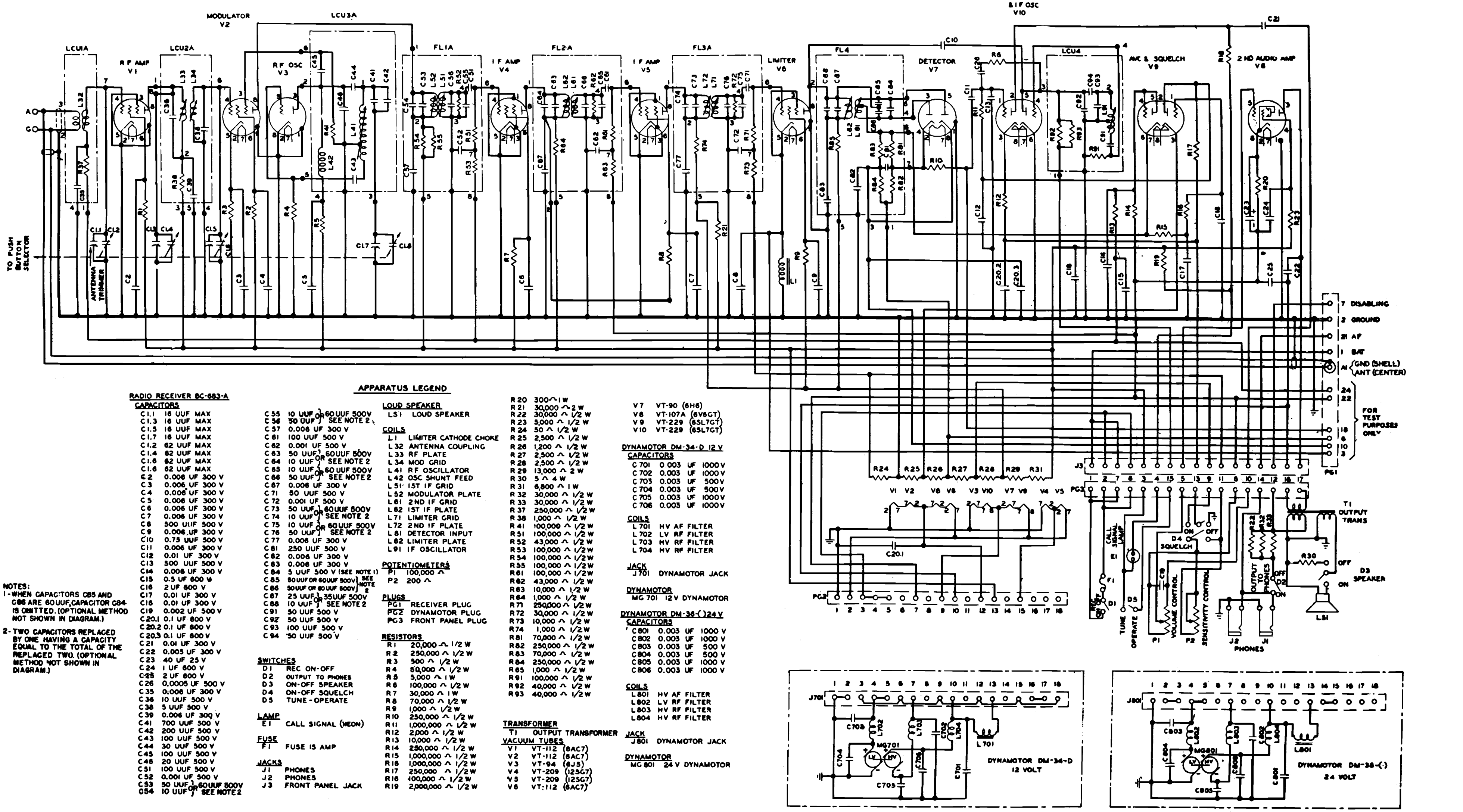
transmitter produces 20 watts output with a frequency deviation of 40 kc. The crystals are in the 375 kc to 540. 277 kc range. On 12 volts the system draws 24 amperes. On 24 volts the system draws 14 amperes.

Frequency changing is accomplished by means of the pre-set push-button. The receiver is known as the BC-683 and the transmitter as the BC-684A.



The SCR-608A and SCR-628A are basically the same equipment. They operate from 27 to 38.9 mc and are calibrated every 100 kc. They operate on FM or CW. The receivers are tunable, but the transmitters are crystal controlled. Ten preset channels are available. The receiver IF is 2.65 mc. They operate on 12 or 24 volts dc and have a loudspeaker built into the receiver. The transmitter produces 20 watts output with a frequency deviation of 40 kc. The crystals are in the 375 kc to 540.277 kc range. On 12 volts the system draws 24 amperes. On 24 volts the system draws 14 amperes.

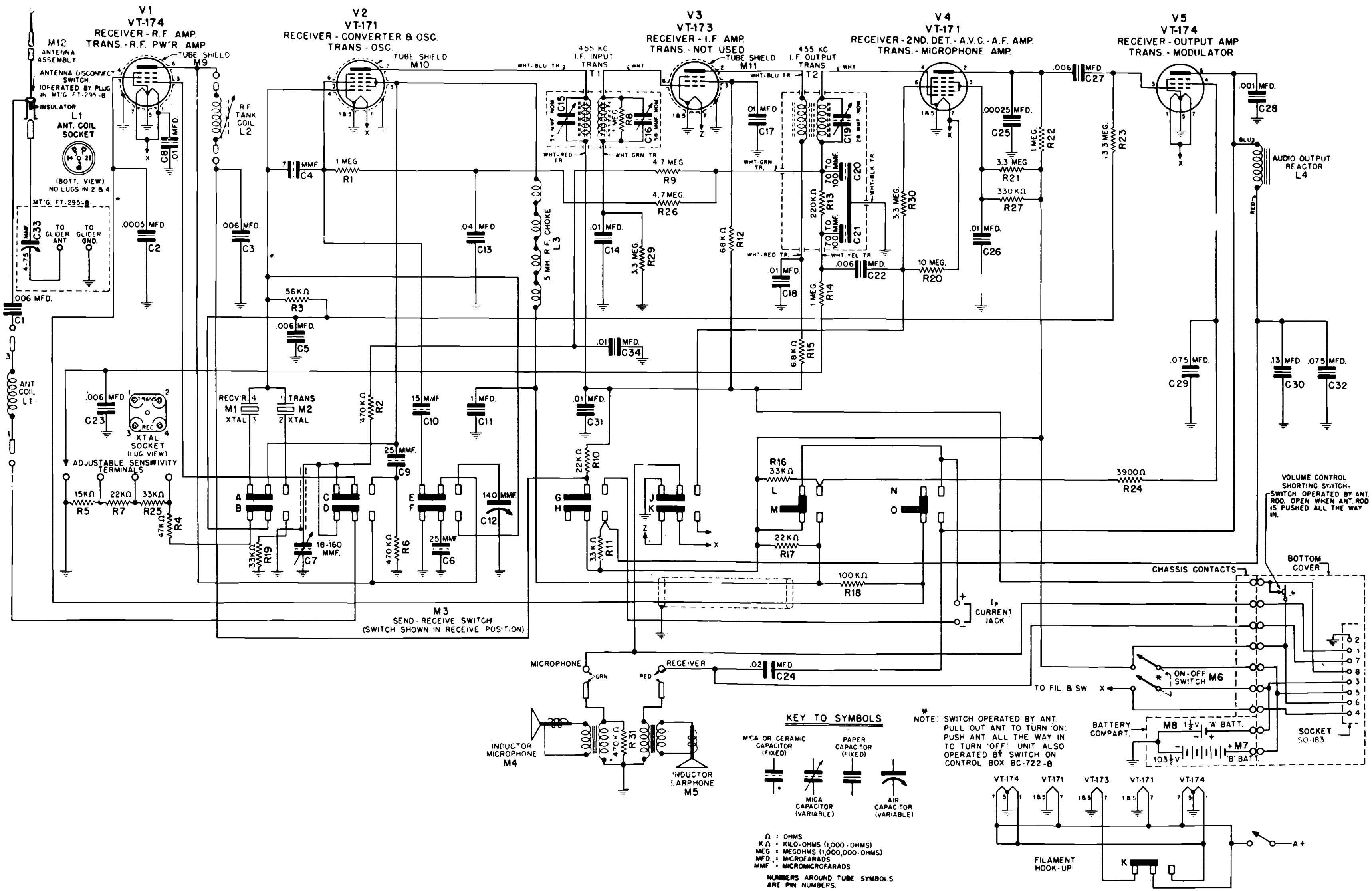
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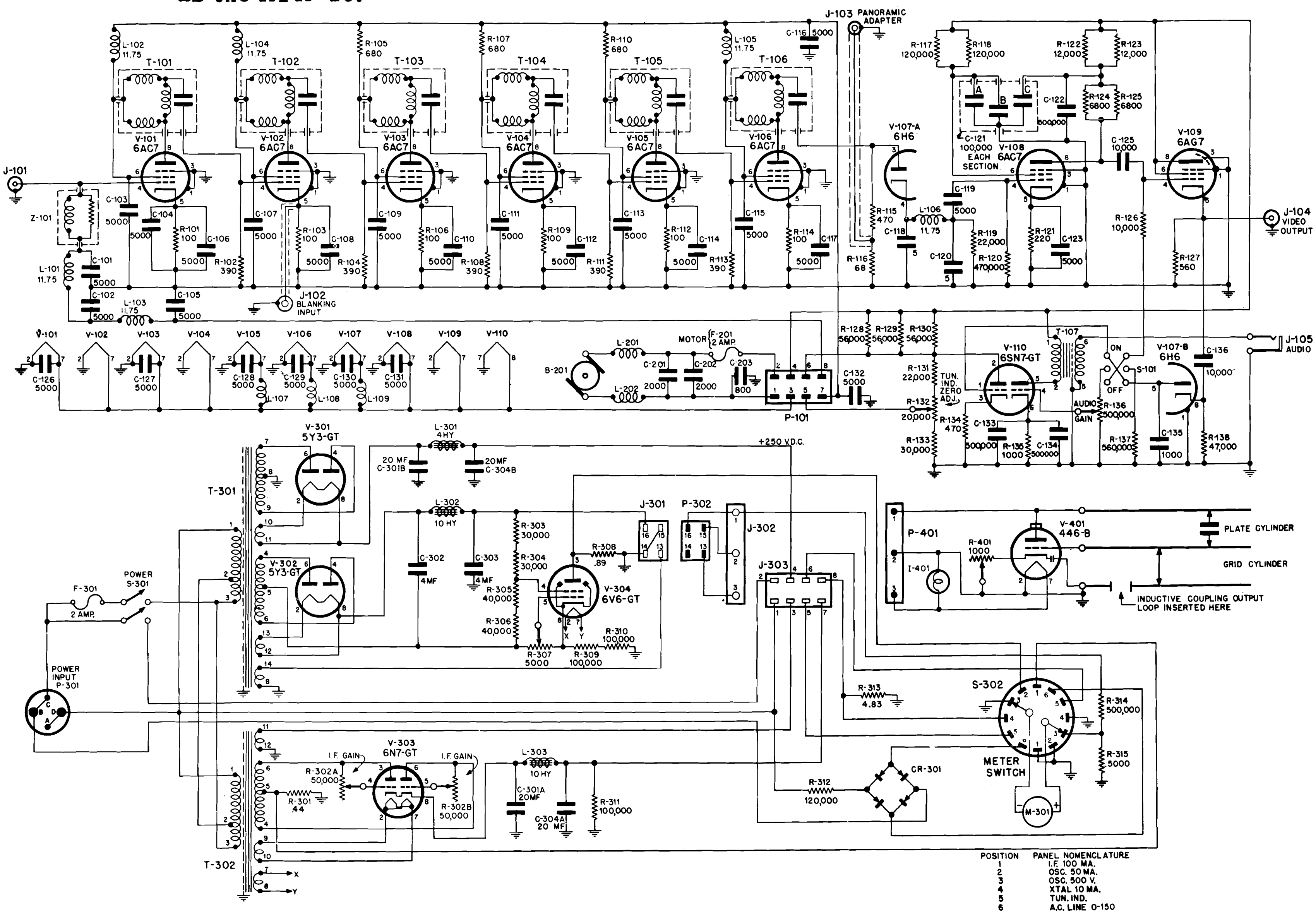
Radio Receiver BC-683-A: Schematic Diagram

SCR-610 (SCR-585, BC-611, BC-721)

3500-6000 kc battery operated handy-talky. 455 kc IF. Crystal controlled. Pulling the antenna operates the unit. Power: 1.5V/.35a and 103.5v/.016a for receive and .035 amps for transmit.



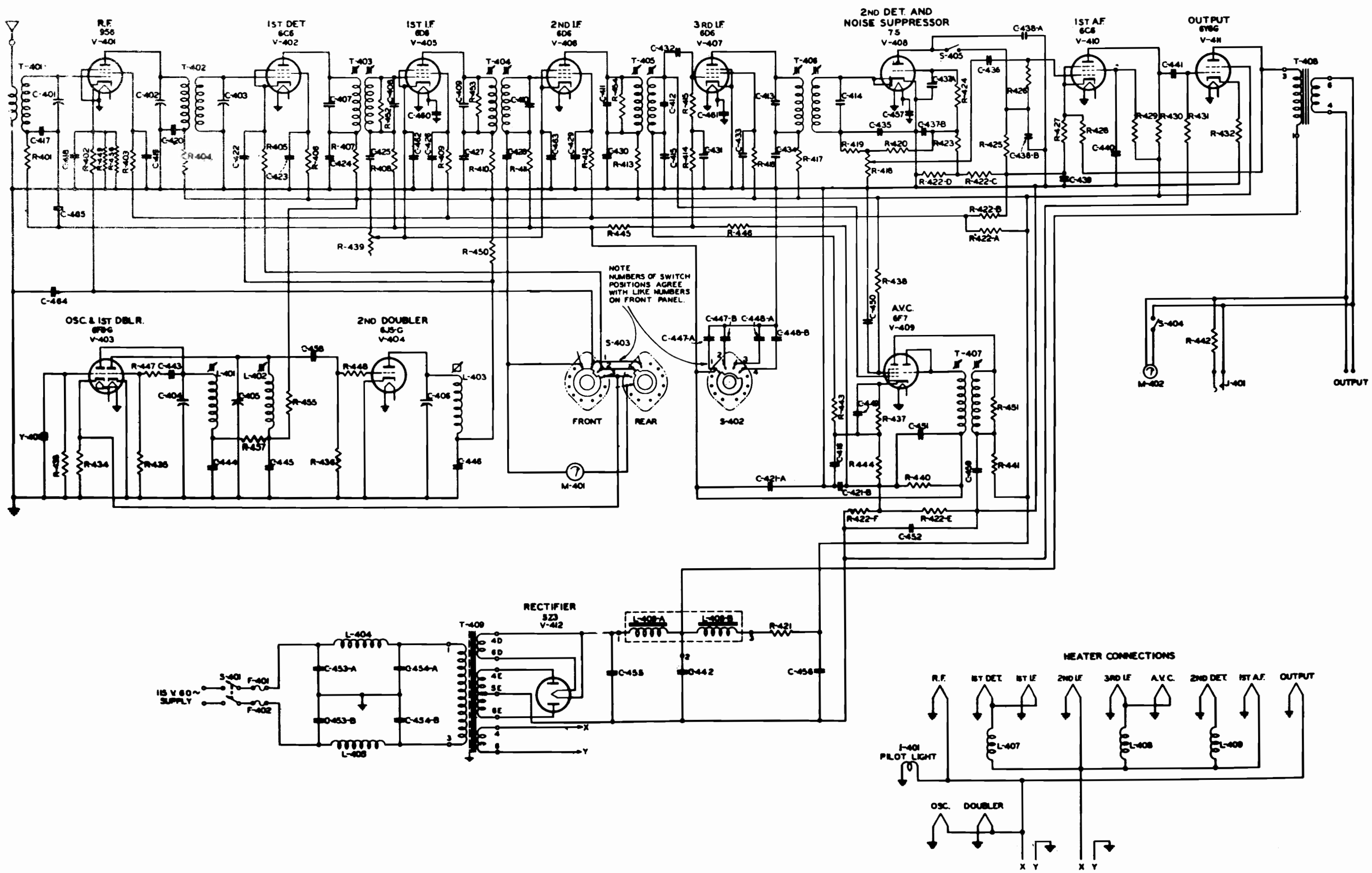
The AN/SPR-2 is classified as a radar receiver. Its purpose was to intercept enemy radar signals for analysis preparatory to countermeasures. It covers the frequency range of 1000 to 6000 mc, but can be used to 10000 mc if the signals are strong enough. Two tuning units are available, the TN-56/SPR-2 which covers 1000 to 3000 mc, and the TN-57 which covers 3000 to 6000 mc. Higher frequency operation is possible because the antenna input is directly to the mixer and harmonics of the oscillator are used to convert the signal to the 30 mc IF. An output is provided, before detection, for a connection to a 30 mc panoramic adapter such as the APA-10.



TBS Receiver

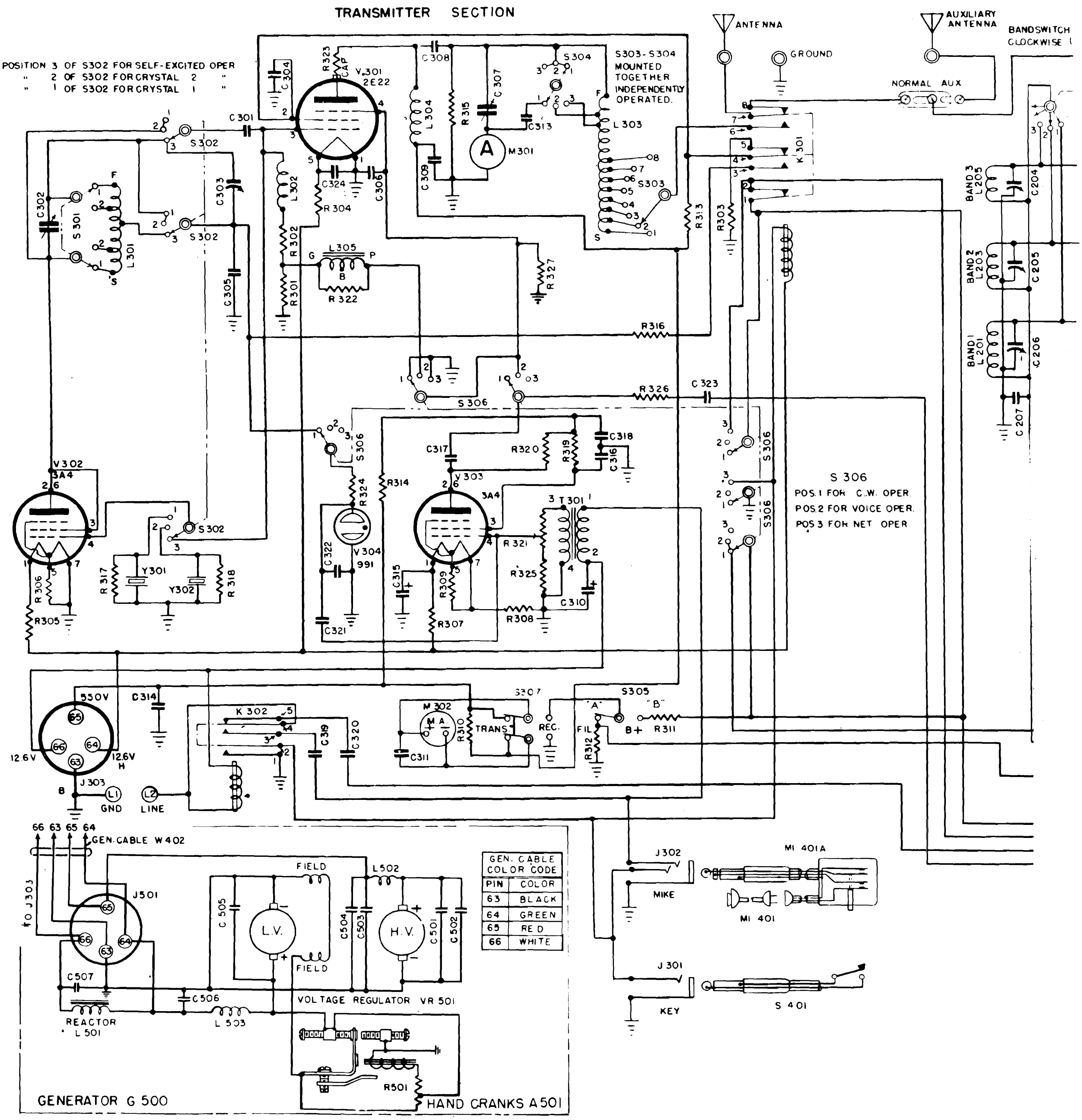
The TBS receiver is a 60 to 80 mc crystal controlled superheterodyne. It employs a 5.3 mc IF and operates directly from 110 volts 60 cps. Each stage of the RF amplifiers, the mixer and the oscillator multiplier is separately tuned and metered whenever necessary.

The TBS includes a noise limiter, AVC, output meter and is designed to operate from 50 ohm coax. The output is 600 ohms. For conversion data, see CQ, May 1958, p. 55.



TBX

Transmitter-receiver. The receiver tunes from 2.0-8.0 mc with an IF of 1515 kc; the transmitter tunes from 2.0-5.8 mc, running 40 watts input on CW and 10 watts on phone. Power: 6 volts bias, 1.5 volts filament and 90 volts for the receiver; 12.6 vdc at 2 amps and 500 volts at 80 ma for the transmitter.



RECEIVER RESISTORS

Symbol	Value	Symbol	Value	Symbol	Value
R201	200k ±10% ½w	R207	10k ±10% ½w	R213	30k ±10% ½w
R202	10k ±10% ½w	R208	1 Meg. ±10% ½w	R214	10k ±10% ½w
R203	50k ±10% ½w	R209	1 Meg. ±10% ½w	R215	6.8k ±10% ½w
R204	2.5k ±10% ½w	R210	50k ±10% ½w	R216	10k ±10% ½w
R205	1k ±10% ½w	R211	150k ±10% ½w	R217	500k ±10% ½w
R206	2 Meg. ±10% ½w	R212	20k ±10% Potentiometer	R218	1k ±10% ½w

RECEIVER CAPACITORS

Symbol	Value	Symbol	Value	Symbol	Value
C201	13.3 mmfd Var.	C215	7-45 mmfd Var.	C229	13.3 mmfd Var.
C202	139.4 mmfd Var.	C216	7-45 mmfd Var.	C230	0.006 mfd ±10% 500v
C203	250 mmfd ±10% 500v	C217	0.006 mfd ±10% 500v	C231	200 mmfd ±5% 500v
C204	7-45 mmfd Var.	C218	0.006 mfd ±10% 500v	C232	0.006 mfd ±10% 500v
C205	7-45 mmfd Var.	C219	0.006 mfd ±10% 500v	C233	200 mmfd ±5% 500v
C206	7.45 mmfd Var.	C220	0.006 mfd ±10% 500v	C234	15 mmfd ±10% 500v
C207	0.02 mfd ±10% 400v	C221	2x.5 mfd ±10% 200v	C235	500 mmfd ±10% 500v
C208	700 mmfd ±1% 500v	C222	0.006 mfd ±10% 500v	C236	10 mfd Elec. 150v
C209	400 mmfd ±1% 500v	C223	0.006 mfd ±10% 500v	C237	25 mmfd ±10% Ceramic
C210	300 mmfd ±1% 500v	C224	100 mmfd ±10% 500v	C238	25 mmfd ±10% Ceramic
C211	7-45 mmfd Var.	C225	5 mmfd ±10% 500v	C239	25 mmfd ±10% Ceramic
C212	7-45 mmfd Var.	C226	2x.5 mfd ±10% 200v	C240	250 mmfd ±10% 500v
C213	7-45 mmfd Var.	C227	0.01 mfd ±10% 600v	C241	0.5 mfd ±20% 600v
C214	7-45 mmfd Var.	C228	100 mmfd ±10% 500v		

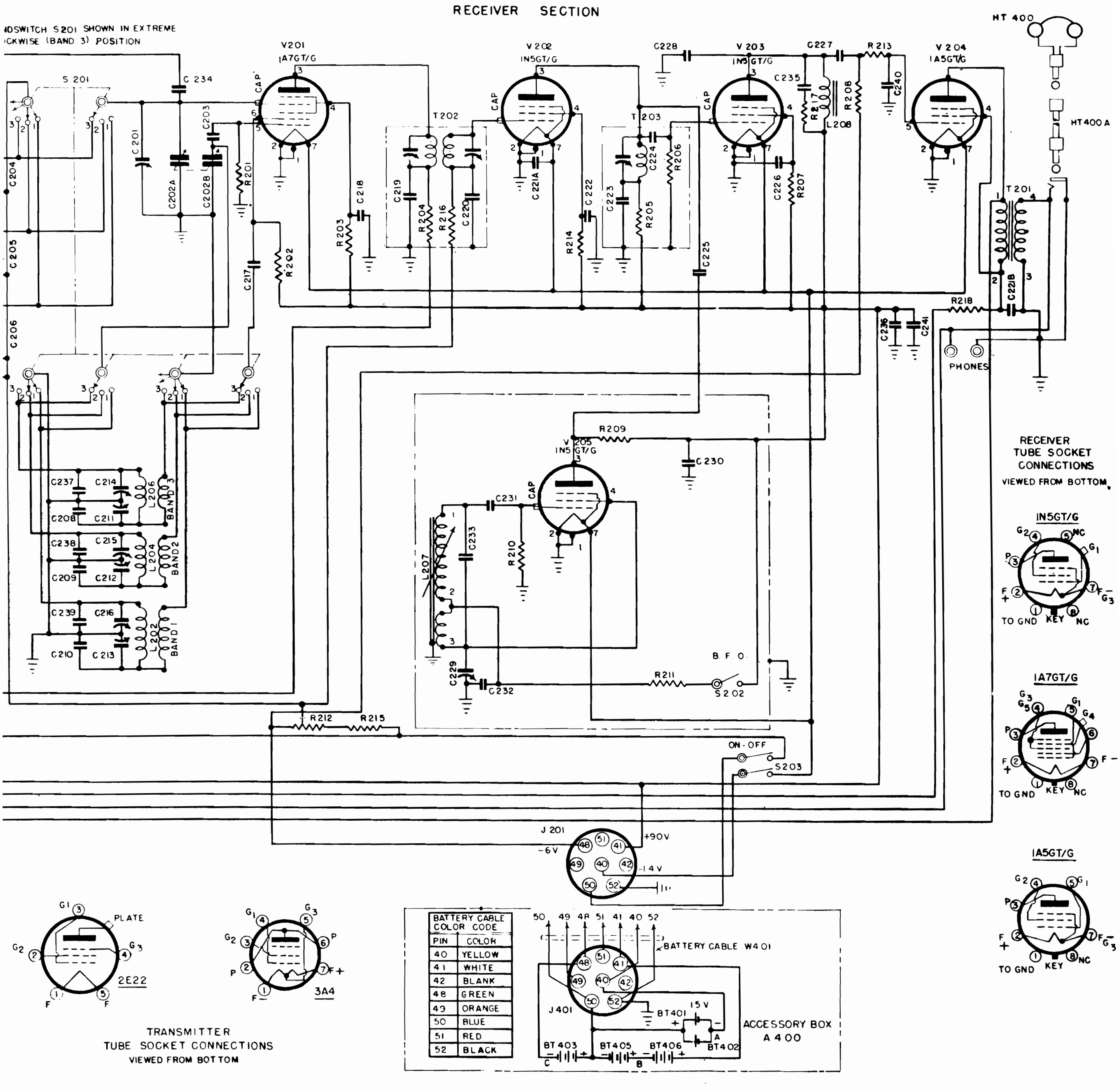
TRANSMITTER RESISTORS

Symbol	Value	Symbol	Value	Symbol	Value
R301	10k ±5% ½w	R310	1.43 Ohms—Evac.	R319	68k ±10% ½w
R302	10k ±5% ½w	R311	140k—Evac.	R320	11k ±10% 1w
R303	5k ±10% 8w	R312	0.4 Ohms—Evac.	R321	100k ±10% Potentiometer
R304	4.0 Ohms ±5% 20w	R313	20k ±10% 8w	R322	68k ±10% ½w
R305	100 Ohms ±5% 2w	R314	20k ±10% 8w	R323	22 Ohms ±10% 1w
R306	240 Ohms ±5% 1w	R315	2 Meg. ±10% ½w	R324	2 Meg. ±10% ½w
R307	30 Ohms ±5% 1w	R316	3.3k ±10% 1w	R325	10k ±5% ½w
R308	68 Ohms ±5% 2w	R317	100k ±5% ½w	R326	150k ±10% ½w
R309	390 Ohms ±5% 2w	R318	100k ±5% ½w	R327	68k ±10% ½w

TRANSMITTER CAPACITORS

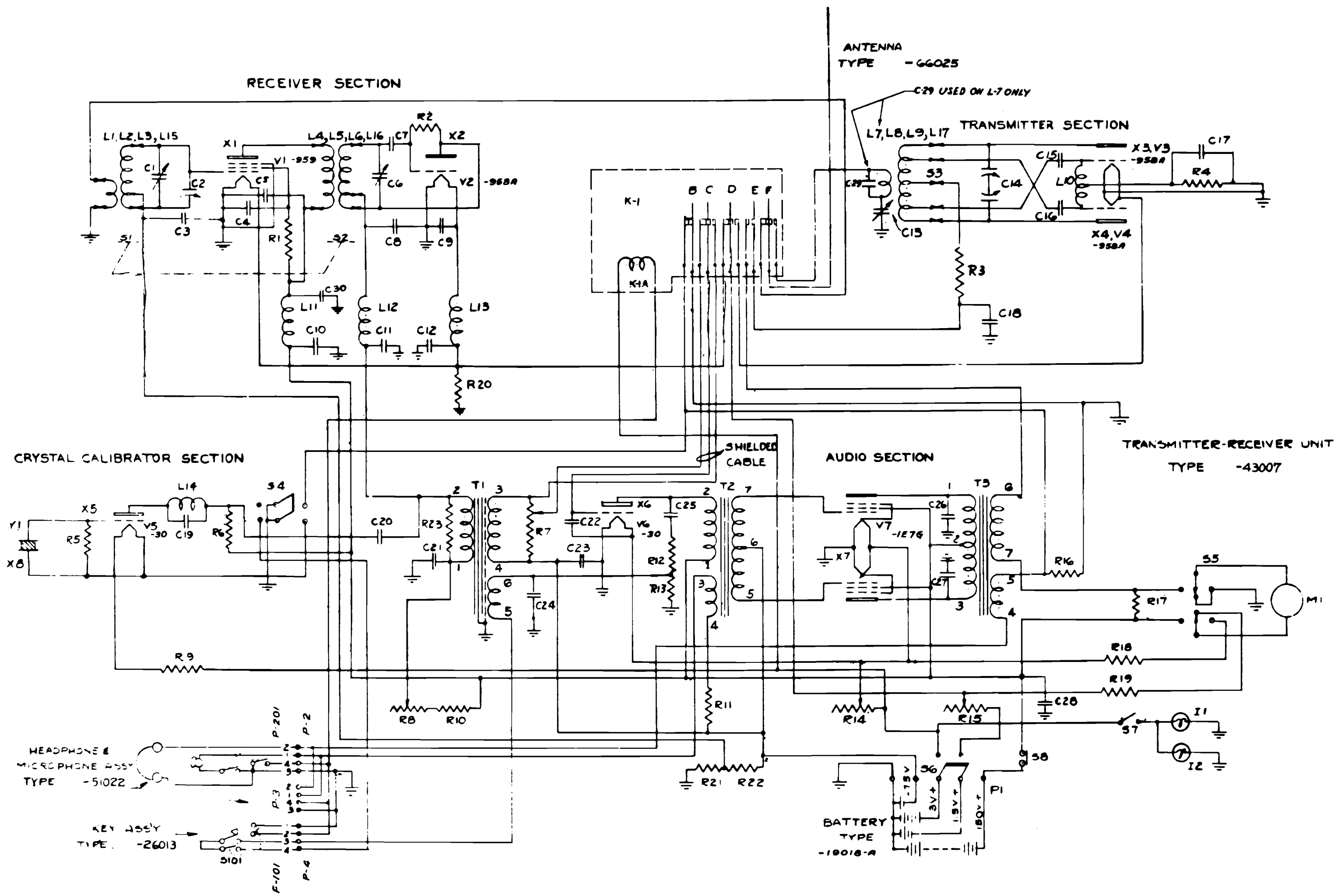
Symbol	Value	Symbol	Value	Symbol	Value
C301	100 mmfd ±2% 600v	C309	0.01 mfd ±10% 1200v	C318	0.5 mfd ±20% 600v
C302	171 mmfd Var.	C310	50 mfd Elec. 25v	C319	1 mfd ±10% 600v
C303	25 mmfd Var.	C311	0.006 mfd ±10% 500v	C320	1 mfd ±10% 600v
C304	0.01 mfd ±10% 600v	C313	110 mmfd ±10% 1200v	C321	0.006 mfd ±10% 500v
C305	0.01 mfd ±10% 600v	C314	0.01 mfd ±10% 1200v	C322	0.0001 mfd ±10% 500v
C306	0.001 mfd ±10% 600v	C315	50 mfd Elec. 25v	C323	0.006 mfd ±10% 500v
C307	193 mmfd Var.	C316	0.5 mfd ±20% 600v	C324	0.006 mfd ±10% 500v
C308	0.001 mfd ±10% 600v	C317	0.5 mfd ±20% 600v		

k = Kilohms
Meg = Megohms



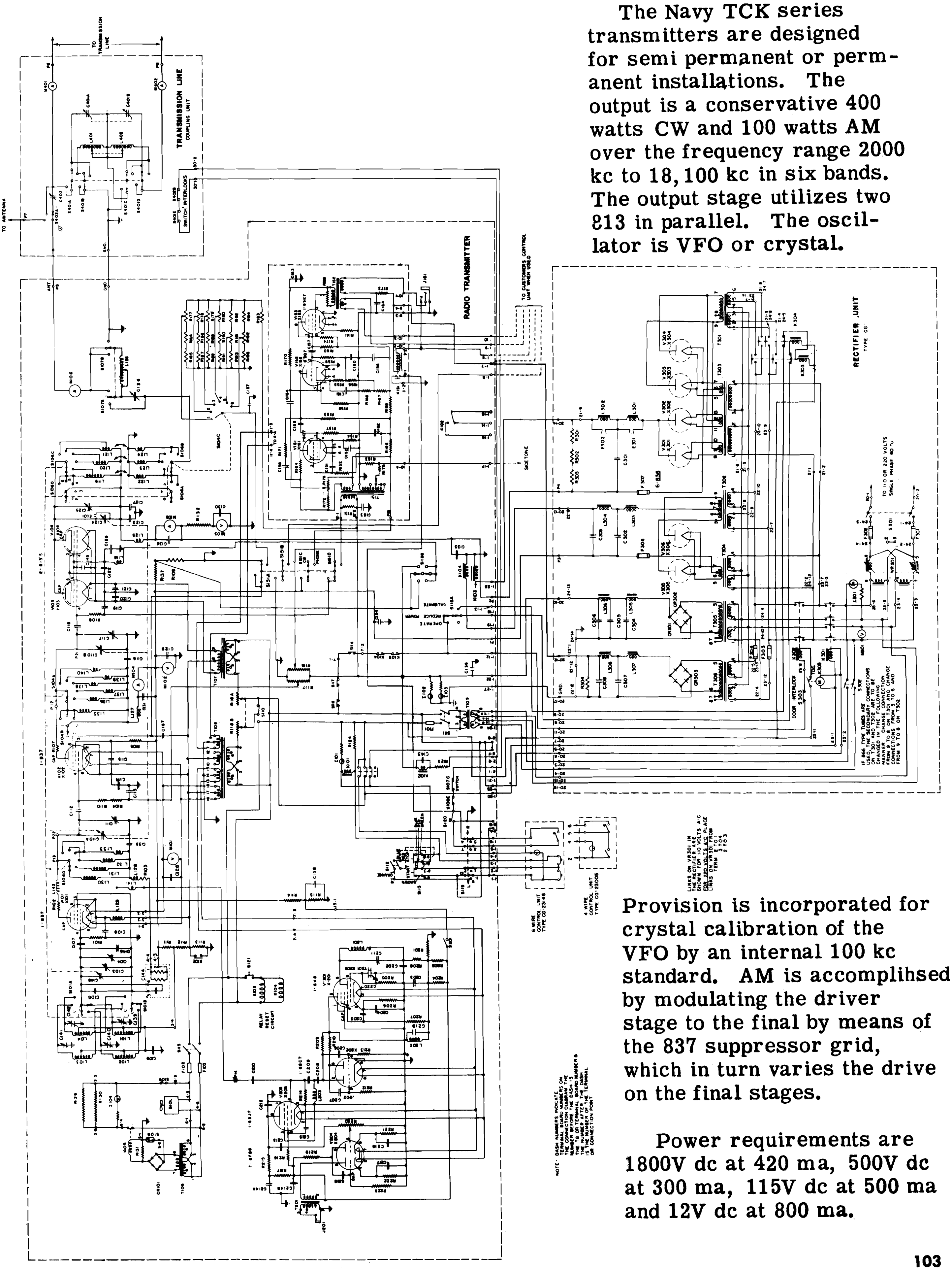
TBY

This is a small, battery operated, 28-40 mc transmitterpreceiver. Its instability makes it a poor unit for amateur use, very poor. For conversion data, see CQ, September 1957, P. 64.



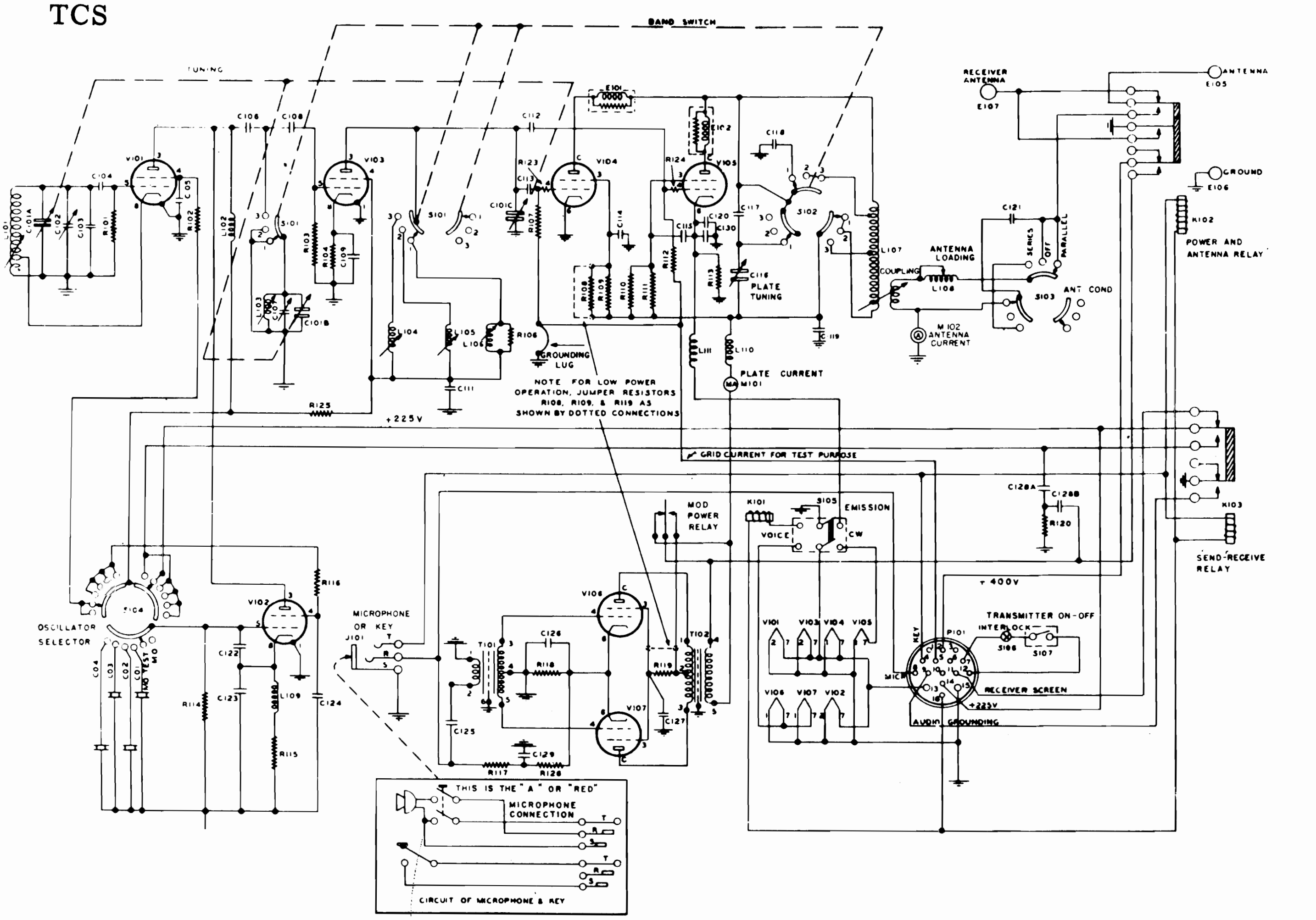
TCK

The Navy TCK series transmitters are designed for semi permanent or permanent installations. The output is a conservative 400 watts CW and 100 watts AM over the frequency range 2000 kc to 18,100 kc in six bands. The output stage utilizes two 813 in parallel. The oscillator is VFO or crystal.



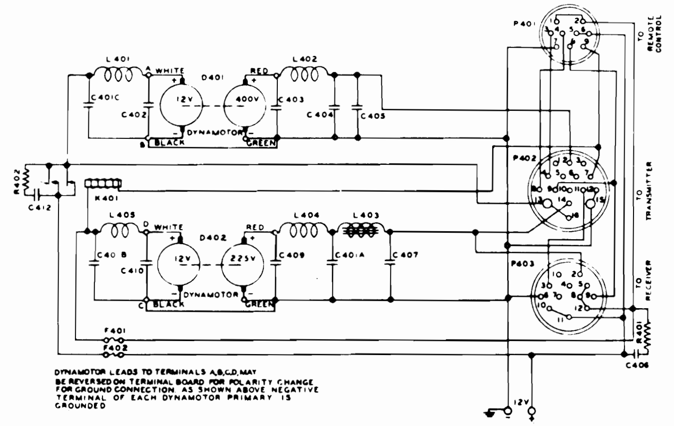
Provision is incorporated for crystal calibration of the VFO by an internal 100 kc standard. AM is accomplihsed by modulating the driver stage to the final by means of the 837 suppressor grid, which in turn varies the drive on the final stages.

Power requirements are 1800V dc at 420 ma, 500V dc at 300 ma, 115V dc at 500 ma and 12V dc at 800 ma.

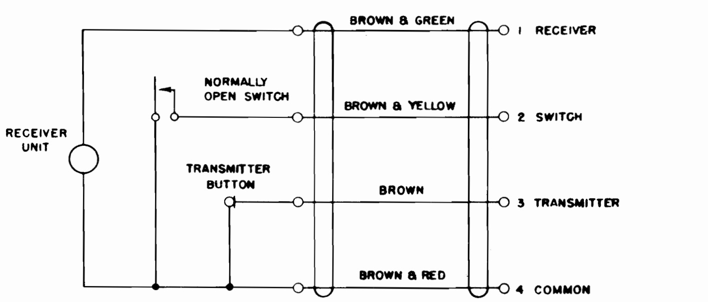


TRANSMITTER UNIT SCHEMATIC

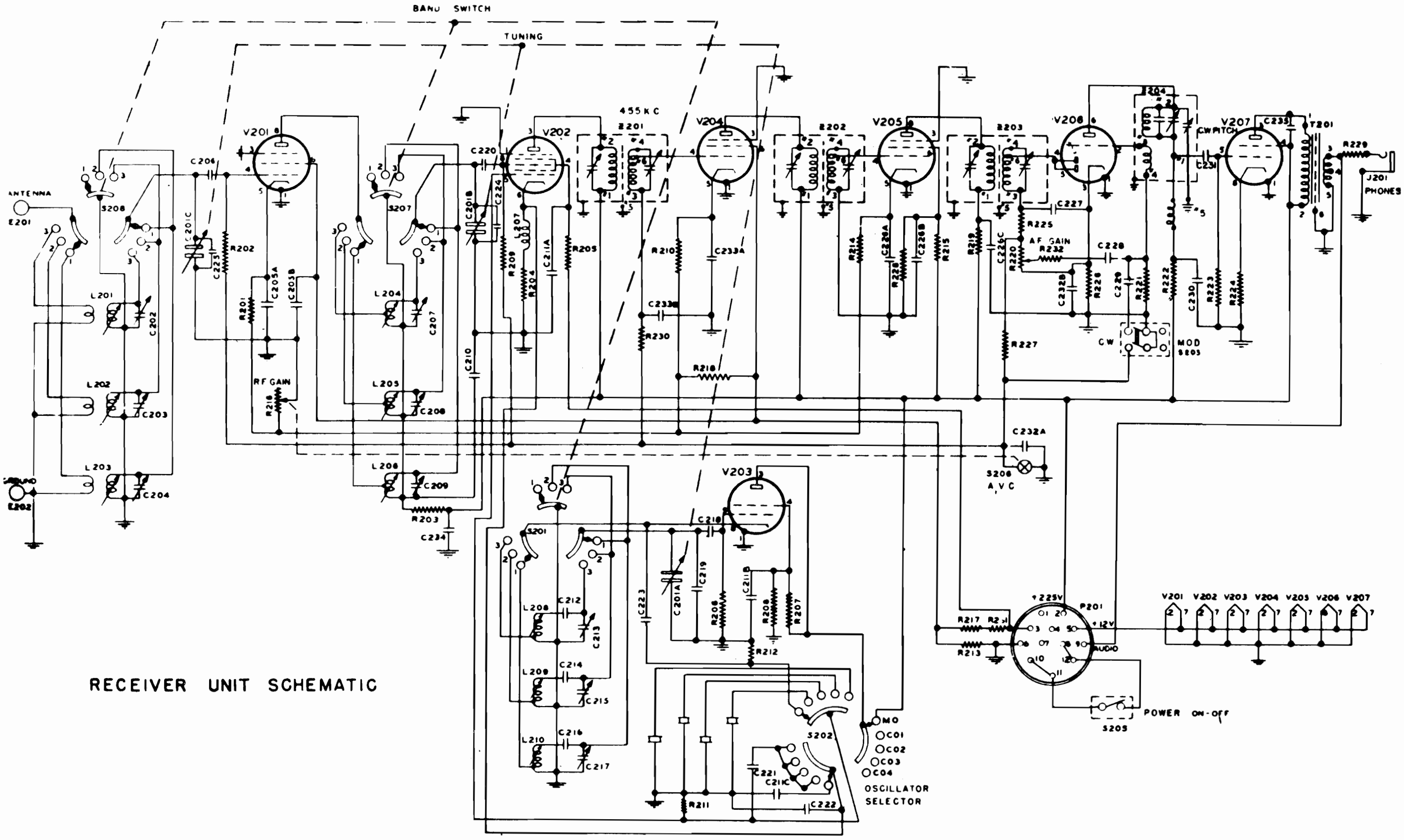
The TCS is a Navy transmitter-receiver equipment providing crystal controlled or tunable communications over the 1.5 to 12 mc band. The transmitter is conservatively rated at 25 watts CW and 10 watts AM phone. The receiver is a superheterodyne with an IF 455 kc. The oscillator is on the



POWER-SUPPLY UNIT



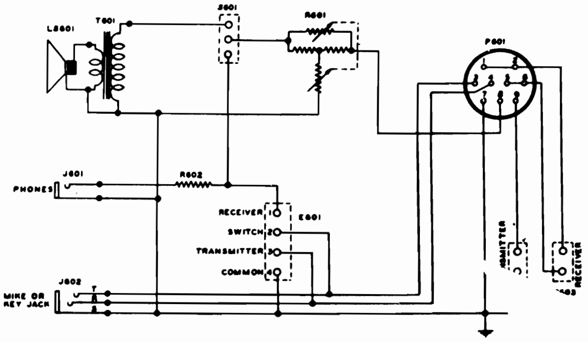
HANDSET SCHEMATIC



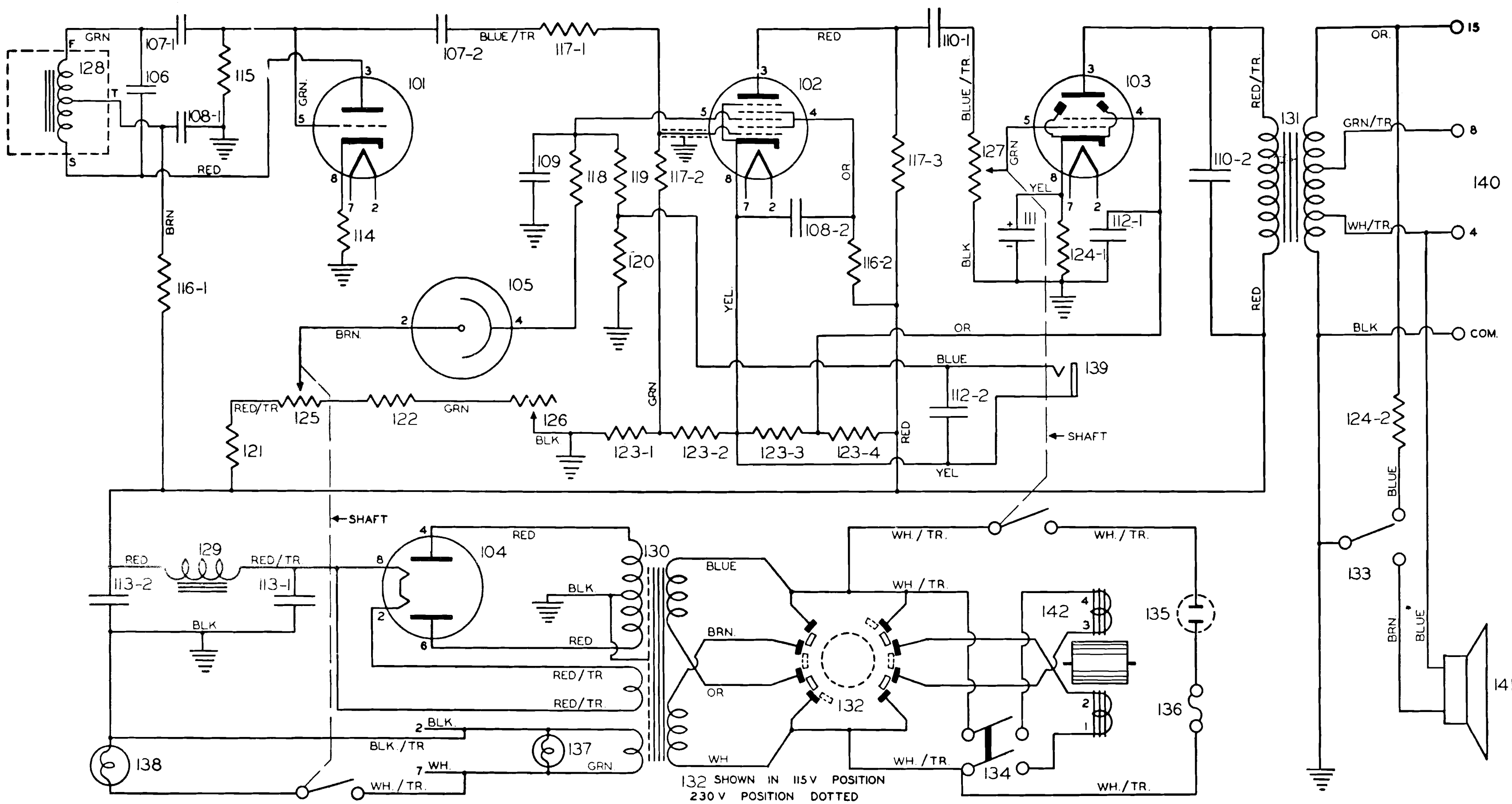
RECEIVER UNIT SCHEMATIC

high side. A separate control box is used when a loudspeaker is required. The main power supply operates from 12 volts dc, although other supplies were made available for operation from 12, 24, 32, 115 volts dc and 115 volts ac.

An antenna tuning unit is provided for the TCS, consisting of a loading coil tapped at appropriate points. Relays are provided for switching and press to talk operation. The various stages of the transmitter are tuned by the VFO know, with fixed adjustments being located under the calibration chart. The output circuit consists of a pi-network which will match a wide range of antenna impedances.



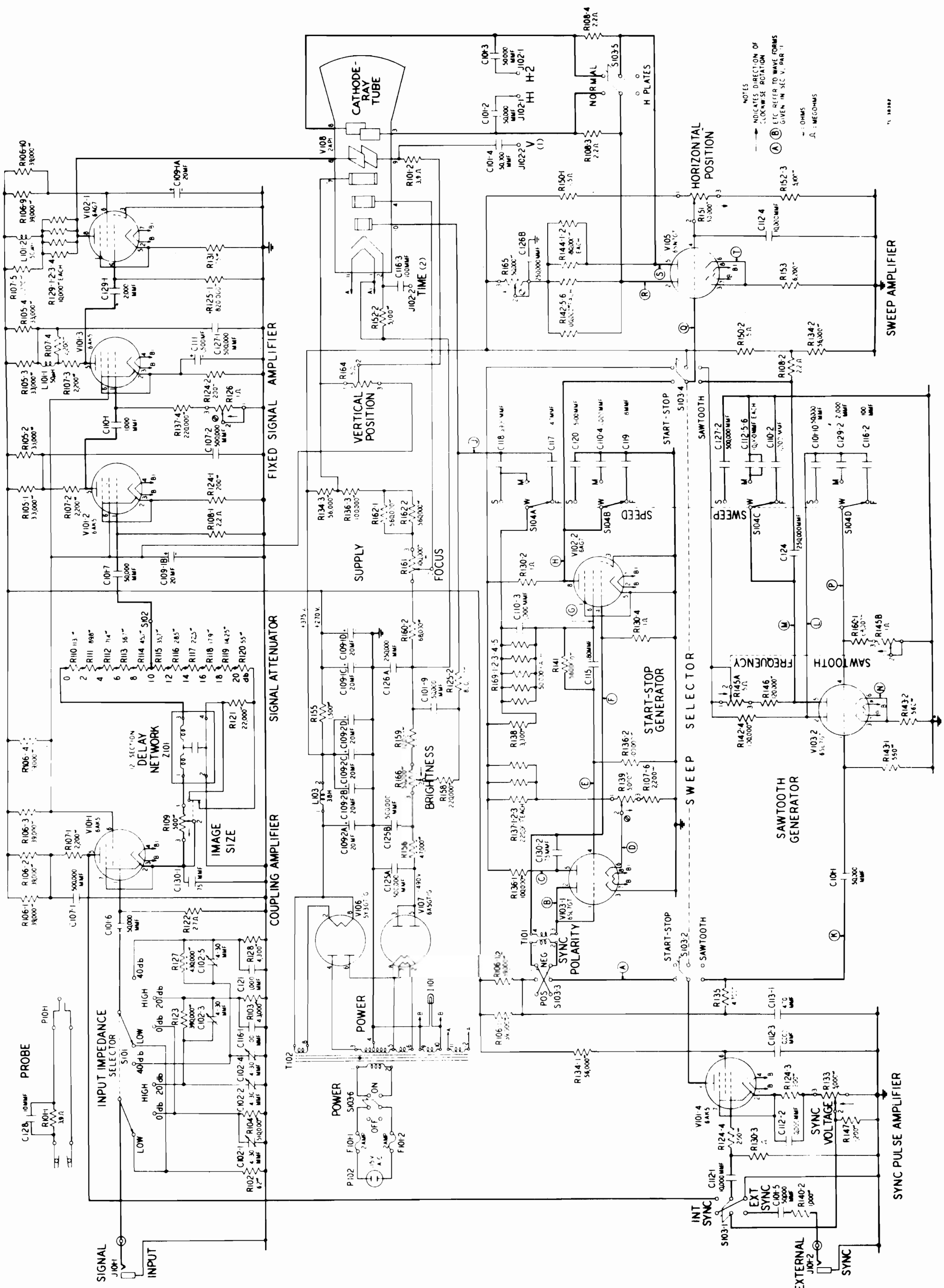
REMOTE-CONTROL UNIT

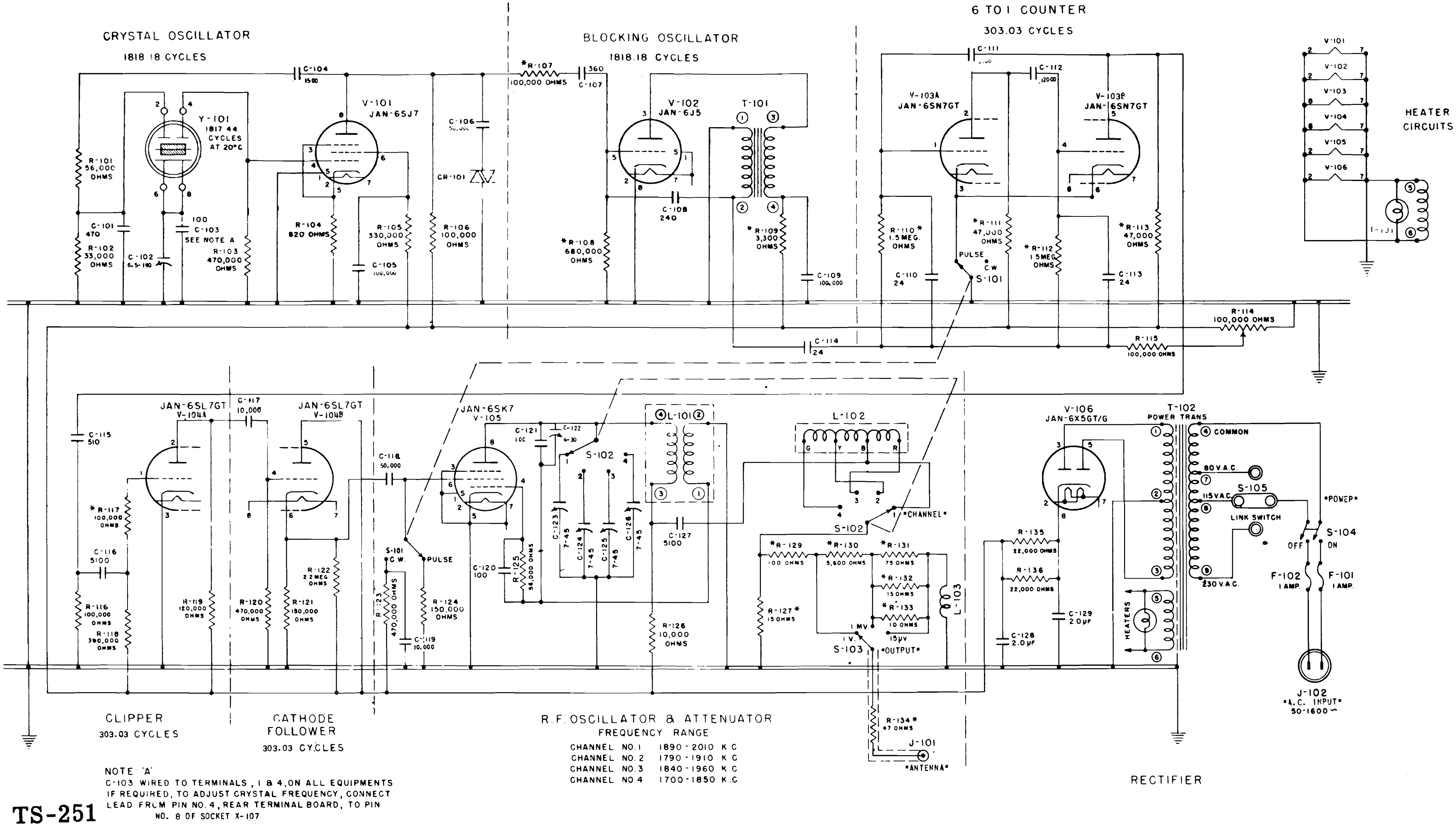


TG-34A

The TG-34-A is a code practice device for automatically reproducing audible code practice signals from a previously recorded inked tape. The paper tape, with correct ink markings, is caused to pass over a beam of light, which is normally blocked by the inked markings. When a signal is desired the ink marking is caused to change its position on the tape, by virtue of the printing process used in the preparation of the tape, and light is permitted to pass through the paper onto a photoelectric cell which in turn keyes an oscillator. The oscillator may also be keyed by a telegraph key. Approximately three watts of power may be obtained from the amplifier within the equipment at either 4, 8 or 15 ohms impedance. The equipment may operate from either 115 or 230 volts 60 cycle AC.

The TS-34 is an extremely flexible portable oscilloscope. It operates from 110 v at from 50 to 1200 cycles and draws 90 watts. The sawtooth horizontal sweep is variable from 10 cycles to 50 kc in three ranges and a separate input is provided for direct connection to the plates. A Start-Stop sweep is available for examining pulses. The sensitivity is .1 to 100 volts. The TS-34 uses a 2" CRT with a built in magnifying glass. There are provisions for internal or external sync. This is a good item for any ham shack.





TS-251

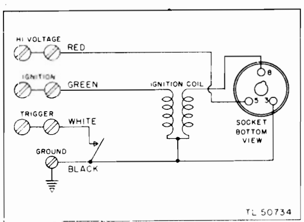
The TS-251/UP is a small portable signal generator used for testing the LORAN type equipment. It operates on four pre-set frequencies,

Chanel	Preset Frequency
1	1950
2	1850
3	1900
4	1750

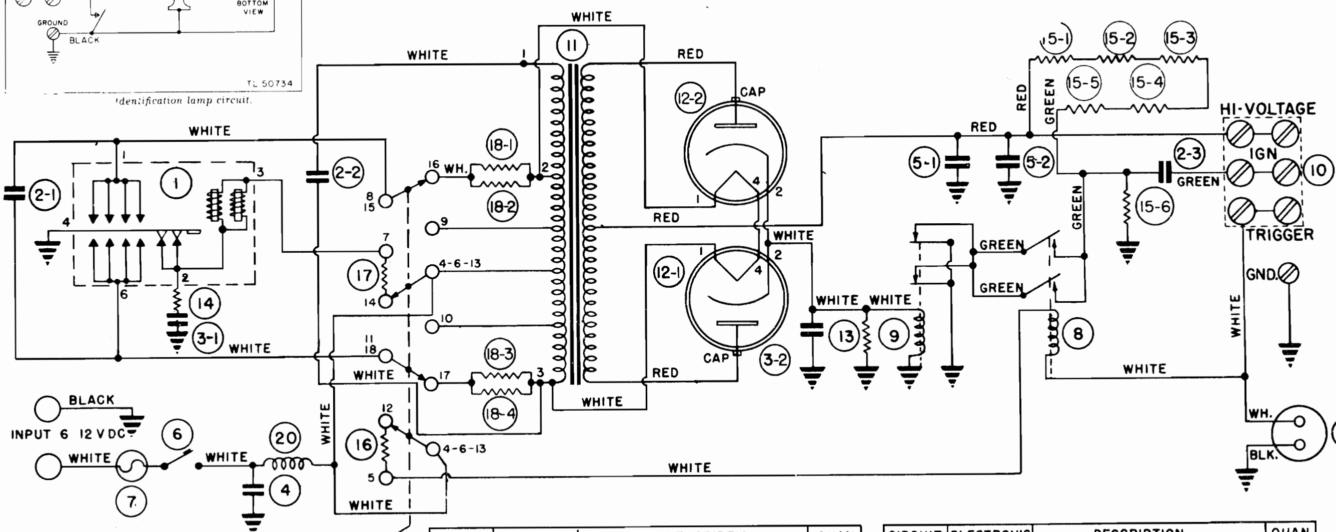
corresponding to the preset frequencies of the Loran receivers. Three levels of output signals are provided. The output is either pulsed or CW, and provides the necessary calibration signals required. The input power is 80, 115 or 230v AC.

AN/VVX-1

The AN/VVX-1 is an electron flash device, suitable for photographic purposes. It originally was used as an identification device for military vehicles, providing one pulse of light which could be aimed at the ground vehicle requiring identification. It is visible up to 3 miles in daylight. A suitable light shield is employed to aid in directing the lamp beam. The power supply is operated by six or 12 volts in the case of the PP-49/VVX-1 or twelve or 24 volts in the case of the PP-50/VVX-1X. The power supply generates 2000v DC for lamp operation -- DANGER HIGH VOLTAGE.



Identification lamp circuit.



SWITCH FROM 6 V TO 12 V BY REVERSING POSITION OF SWITCHING BAR PLATE FOLLOW MARKINGS ON TERMINAL BOARD.

COLOR CODING	
BLACK	ALL GROUNDS
WHITE	UNGROUNDED PRIMARY & FILAMENT
GREEN	BIAS CIRCUIT
WHITE	TRIGGER & TIMING CIRCUIT
RED	HIGH VOLTAGE SECONDARY

CIRCUIT REF. NO.	ELECTRONIC TYPE NO.	DESCRIPTION	QUAN.
1	LTS-1282	VIBRATOR	1
2	C-118	CAPACITOR 1 MFD, 165 V AC	3
3	C-113	CAPACITOR 0.5 MFD, 50 V DC	2
4	C-268	CAPACITOR 0.5 MFD, 50 V DC	1
5	C-299	CAPACITOR 23 MFD, 2000 V DC	2
6	E-33	ON OFF SWITCH	1
* 7	E-37	FUSE, 40 AMP, 4 AG (FOR 6V)	1
8	R-82	RELAY, TRIGGER CIRCUIT	1
9	R-105	RELAY, TIMING CIRCUIT	1
10	S-396	TERMINAL	1

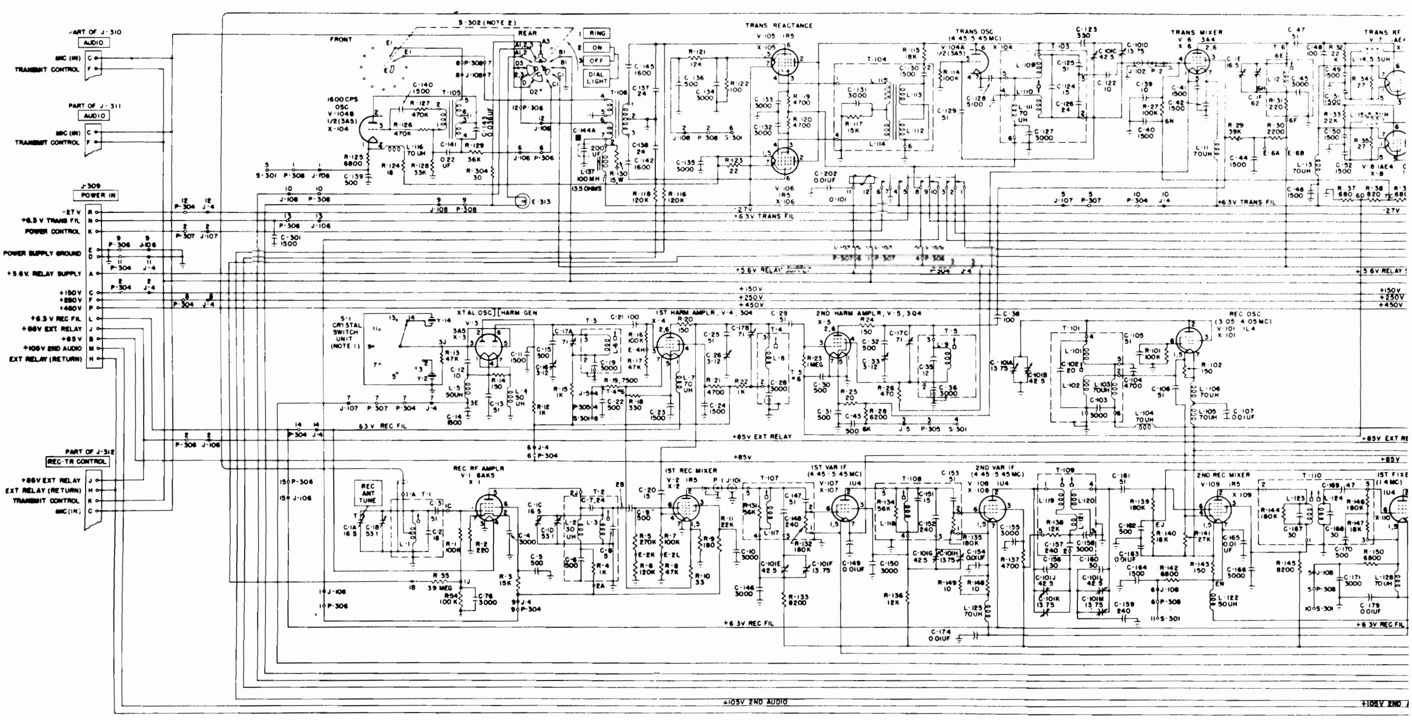
* FOR 12 VOLT OPERATION USE E-32 20 AMP. 4 AG FUSE

CIRCUIT REF. NO.	ELECTRONIC TYPE NO.	DESCRIPTION	QUAN.
11	A-1128	TRANSFORMER	1
12	12X3	TUBE, RECTIFIER	2
13	W-50	RESISTOR 500 OHM 10 WATT	1
14	W-78	RESISTOR 5 OHM $\frac{1}{2}$ WATT	1
15	W-59	RESISTOR 200,000 OHM 1 WATT	6
16	W-43	RESISTOR 50 OHM 10 WATT	1
17	W-42	RESISTOR 5 OHM 10 WATT	1
18	W-169	RESISTOR .25 OHM 10 WATT	4
19	S-214	CONNECTOR	1
20	A-1318	RF CHOKE	1

AN/VRC-8-9-10

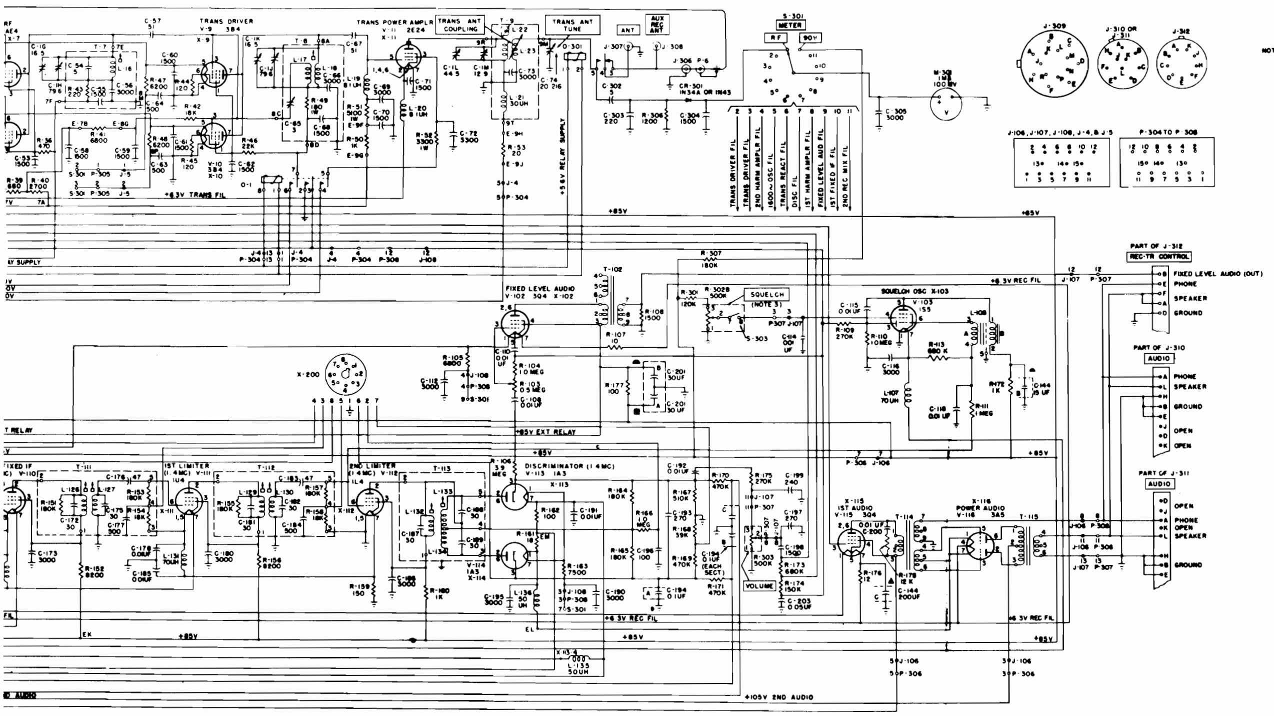
The AN/VRC-8-9 and 10 are three equipments that are primarily identical except for frequency range of operation. The AN/VRC-8 covers the range of 20. 0 to 27. 9 mc. The AN/VRC-9 covers the range of 27. 0 to 38. 9 mc. The AN/VRC-10 covers the range of 38. 0 to 54. 9 mc. The emision is FM and provision is made for voice and mcw (FM) operation. Provision is made for preset or continuous tuning type of frequency control. Push to talk as well as remote operation are features of this equipment. The power output may be either 2 watts or 16 watts depending upon the operation at low or high power. The receivers are extremely sensitive, being able to provide 30 db of quieting for a one-half microvolt signal. The input power is 12. 6 volts at 2. 3 amperes for receive and 11. 9 amperes for transmit conditions or 24 volts at 1. 5 amperes for receive and 7. 3 amperes for transmit, under high power output. The basic receiver-transmitters have been assigned the nomenclatures as follows.

RT-66/GRC	for the	AN/VRC-8
RT-67/GRC	for the	AN/VRC-9
RT-68/GRC	for the	AN/VRC-10



Each receiver is a double conversion superheterodyne. The RF amplifier tunes the signal and the first mixer converts it to a band of 4. 45 to 5. 45 mc whereupon the first IF stages are tuned to correct incoming signal and it is converted in the second mixer to the final (second) IF of 1. 4 mc. Limiters operate in the second IF to eliminate any AM of the signal and allow the discriminator to operate properly. The receiver first oscillator uses a crystal oscillator and a harmonic generator operating at the low side of the signal. Likewise, the second oscillator operates at the low side of the signal. The transmitter oscillator is kept on frequency by sampling part of the transmitter oscillator signal and causing the reactance tube to keep the oscillator on frequency, by way of the discriminator action on the signal.

The equipment includes, AVC action, squelch, side tone provisions and a construction of extremely good quality.



NOTES

1 CRYSTAL SWITCH ASSEMBLY CHART

XTAL POS NOS	CRYSTAL FREQ'S KC
1	
2	7775 000
3	8275 000
4	
5	8775 000
6	
7	6183 333
8	
9	6516.666
10	
11	6850.000
12	
13	7183.333
14	7516.666
15	
16	
17	

2 SWITCH S-301 IS VIEWED FROM PANEL SIDE AND SHOWN IN OFF POSITION ROTOR SECTIONS ARE DESIGNATED BY LETTERS A,B,C, ETC, AND CONTACTS ARE DESIGNATED BY A LETTER AND A NUMBER THE LETTER INDICATES THE ROTOR SECTION THRU WHICH THE CONTACTS COMPLETE A CIRCUIT, THE NUMBER INDICATES THE SWITCH POSITION IN WHICH THE CONTACT IS IN A COMPLETED CIRCUIT

3 POTENTIOMETER R-302 IS A DUAL UNIT, ONLY 1 SECTION IS USED.

4 E-2K, E-2L, E-4H, E-6A, E-6B, E-7B, E-8G, E-9H, AND E-9J ARE TEST POINTS NUMBER IDENTIFIES CIRCUIT SECTION ASSOCIATED, FOR EXAMPLE, E-2K IS ASSOCIATED WITH V-2, E-4H WITH V-4 ETC LETTER INDICATES SEQUENCE

5 1A, 1B THRU 9R ARE TIE POINTS ON RF CHASSIS NUMBER IDENTIFIES ASSOCIATED CIRCUIT SECTION, LETTER INDICATES SEQUENCE

6 UNLESS OTHERWISE SHOWN RESISTORS ARE IN OHMS, CAPACITORS ARE IN UUF.

7 THE VARIABLE CAPACITORS WITHIN EACH OF THE FOLLOWING GROUPS ARE GANGED
A- C-1B, C-1D, C-1F, C-1G, C-1J
B- C-17A, C-17B, C-17C
C- C-101B, C-101C, C-101E, C-101G, C-101J, C-101L

8 UNLESS OTHERWISE SHOWN RESISTORS ARE 1/2 WATT

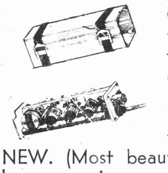


BARRY'S BEST BUYS

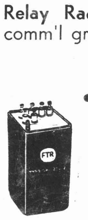
- **TCS Noise Limiters** — Complete Adaptor unit w/spec. sheet .... **99¢ each**
- **T17 Mike**/new **$4.95**
- **Hi-Fi Special**—W.E. 300B Audio Output Tubes **$5.50 ea.** .... **2 for $10.00**
- **3 BPI-3"** Cathode-Ray Tube with Socket—New—R/E .... Both for **$1.50**
- **AN-9000 UHF Antenna Assembly**—Type AS-32/APXI weatherproof yellow finish. Antenna height 16¼" .... price **$1.00**
- **CR-1 Snooperscope Tube**—Unused w/specs. **$2.50**
- **BC-457A** (4 to 5.3 Mcs.) **XMTR** used **$4.95**
- **BC-458A** (5.3 to 7 Mcs.) **XMTR** used **$4.95**
- **1" Round**—0-200 microamps, Mf'd. by Int'l. Inst. **$2.95**
- **Mallory Inductuner**—Unused. This famous device is an excellent VHF front-end tuner suitable for TV, FM, Ham/Comm'l revrs. etc. Brand new, unused. Tunes from 55 thru 220 mcs. **$2.95**
- **C. D. Model No. 3414 Heavy-Duty** 300 Volts D.C. Output at 335 MA. Vibrator Supply Units are made with the finest of components and best construction for long trouble-free use. All units are brand new, packed in original C.D. Jobber-Cartons. Units come complete with two CK-1006 Rectifier Tubes and C.D. Vibrator Type 12VF10. Input: 12.6 VDC. Output: 300 Volts D.C. at 335 Miliamperes. Size: 8-½" High x 13-¼" Wide x 7-¼" Deep. Weight: 28 lbs. Catalog No. CD-3414 .... **$15.00**

FACTORY DISTRIBUTORS FOR NATIONAL, JOHNSON, B&W and HAMMARLUND!

- **Wanted to Buy:** Many types of unused tubes, semi-conductors and equipment.



- **UHF Beacon Transmitter**—Compact. Near 1-¼ meter band. Converts easily to 2 meters. Uses (2) 6201's. into single Amperex 6360 twin triode. Size: 4" x 4" x 11". Antenna is 10-½". NEW. (Most beautiful rig. Finest parts we have seen in years). A real gem, complete with tubes, antenna and case (no book). Price: **$19.95.** Battery for above Transmitter furnishes 300 VDC plate and 6.3 VDC filament. Submersible type **$4.95**
- **Relay Rack Panel**—8¾" x 19. Beautiful comm'l grey ⅛" steel. .... **each 90¢**

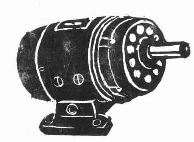


- **FTR Transformer** "Little Gem"—Pri: 19,000 Ohms. Sec: 600 Ohms 1⅛" x 1⅛" x 2" high. Hermetically sealed. Brand new, original boxed. Mfd., by Federal Tel. & Radio. Ultra compact construction. Weight less than 2 ozs. Ideal for use as plate to line or line to grid, phone patch and telephone uses. Designed for audio use in range from 250 to 2500 CPS. Catalog No. GH-1202. Price **49¢** each. (Lots of 10 **35¢** ea.)

- **Filter Choke**—.35 Hy. @ 2 Amps (2.2 Ohms DC resistance) Herm. Sld.—**$4.95.** Open frame **$3.95**
- **TS-78/U Tune-Up "Dummy" Load**—Excellent for citizen Band or VHF **$1.00**
- **HS-30 Headsets with Headband & Impedance Matching Xfmr.** Works on hi/lo imped. **$1.59**
- **Silicon Rectifier**—500 Ma.—130 V. (RMS) Special .... **70¢**

Barry's Green Sheet 25¢—(Chock full of Ham and Industrial electronic components, equipment and electronic tubes). Has prices for tubes, semi-conductors, tube cartons. ALL at sensible prices with Barry guarantee (cost of mdse only). $5.00 minimum order. Mdse subject to prior sale. INDUSTRIAL INQUIRIES INVITED. Factory authorized distributors for Westinghouse tubes and semiconductors.

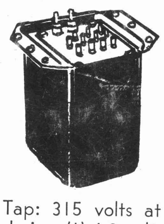
- **Westinghouse Scope Transformer**—Pri: 115 VAC @ 60 CPS (16.5 VA.) Sec: 2.5 Volts @ 3 Amps. Sec: 3890 V. @ .0023 Amps. Brand New. Weight: 9 lbs. **$3.95**



- **3/16 H.P. Continuous Duty Motor**—MFD. by Russell Electric. 115 VDC. at 1.8 Amps. temperature rise: 40° C. — 3450 R.P.M. Dimensions: Overall height: 6¼". Diameter 5". Shipping weight: 30 lbs. Brand new in original cartons. Very special price **$4.95**

B&W MINI-DUCTORS STOCKED

- **Sontone Rechargeable Battery Cartridge**—Model FC-2 .... **$7.95**
- **Johnson Citizen's Band Messenger**—12 VDC/115 VAC. .... **$139.75 each**

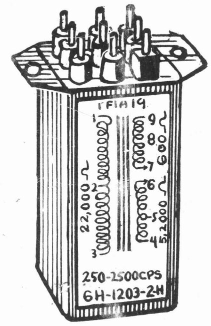


- **Hammarlund Super-Pro Power Transformer**—Manufactured by Chicago Transformer Co.—Beautiful heavy-duty construction. Hermetically sealed Pri: 115 or 230 volts at 60 cps. Sec: 415-0-435 at 160 Ma. RMS. (Bias Tap: 315 volts at 11 Ma.) Filament secondaries: (1) 6.3 volts at 7 amps. (2) 5.0 volts at 2 amps. (3) 5.0 volts at 3 amps. Dimensions: 7" h. x 6½" w. (including flanges) x 6⅛" d. Net weight 20½ lbs. This transformer is type used in power supply model RA-94A and is designated T-3. Unused. .... **Special Price $4.50**

Come in and browse. We are open Saturdays from 9:30 am to 3 pm. Subways: BMT (local) to Prince St. Walk 1 block to Spring St. IRT Lex. (local) to Spring St. Bus: Broadway #6 Bus to Spring St. Car: We are 4 blocks North (uptown) of Canal St. Parking allowed on Broadway on Saturday.

All prices F.O.B. N.Y.C. Specify method of shipment. All merchandise insured and guaranteed for cost of mdse only. Receiving tubes guaranteed 90 days—Special purpose & Xmtg. tubes and equipment guaranteed 30 days. Most test equipment in good, used condition.

- **Super Pro Choke**—50 Hy. @ 120 Ma. Herm. sd. (1150 Ohms DC resistance) 6½ lbs. **$1.00**
- **Super-Pro Choke**—45 Hys. @ 120 ma—920 Ohms—H.S. **$1.00**



- **SSB Versatile Miniature Transformer**—Same as used in W2EWL SSB rig — March '56 QST. 3 sets of C.T. windings for a combination of impedances: 600 Ohms, 5200 Ohms, 22000 ohms. (By using the center taps the impedances are quartered.) The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, phone patch, line to grid or plate, impedance choke, etc. Size only 2" H x ¾" w. x ¾ d. Brand new—fully shielded in original cartons. Weight: 2½ ounces. **95¢ each**, 3 for **$2.50**, 10 for **$7.50.**
- **Glas-Line Non-Metallic Guy Line**—(eliminates need for glass (break-up" insulators) Strong, weather resistant, plastic coated spun glass fibers form a high tensile strength (9 strands) guy cable. Ideally suited for the heaviest amateur antenna in use today. Extensively used in commercial service too. Guaranteed not to rot, rust, or deteriorate for five years or more. Packed in 600 ft. reels, but sold in any multiple of 100 ft. Per 100 feet **$2.98**—600 foot Roll **$17.00.**
- **New! Super-Test Glass-Line**—(1,000 lbs. tensile strength—18 strands.) Sold in 600 ft. rolls. 100 ft. **$5.50**—**$31.54** per 600 ft. roll.
- **AC Voltmeter**—O to 250 VAC. Full-scale 2½" Round. 117 volt point marked in red to show normal voltage. Mfd for Stancor. **$1.75**
- **BC-603 Power Supply**—Completely wired, ready to operate. For the popular BC-603 receivers. Has exact connector. 115 VAC 60 CPS operation. **$9.95**
- **AC Voltmeter**—0 to 250 VAC. Full-cale 2½" round. 220 volt marked in red to show normal voltage. Mfd for Stancor. $1.75
- **Quartz Crystals, Type FT-243**—In series of 120 pieces per set from 5675 KC to 8650 KC. Ten sets per wood case. **.35** each. (**$30.00** per set of 120 pcs.)
- **CK-722** .... **85¢**

Other Transistors and Diodes in stock.

- **Special Transmitting & Special Purpose Tubes:** 3B28 @ **$3.00**; 4-125A @ **$29.00;** 4-250A @ **$38.00;** 4X150A @ **$7.00;** 4X250B @ 35.00; RKR-72 @ 15¢ HF-100 @ **$8.00**; 204A @ **$12.00;** 300B @ **$5.50;** 404A/5847 @ **$6.00**; 807 @ **$1.15;** 811 @ **$3.25;** 830B @ **50¢**; 837 @ **$1.00;** 838 @ **$1.00**; 884 @ **90¢**; 5654 @ **$1.75;** 8013 @ **$3.00** Many others. Largest diversified tube stock in country. Write for Special purpose & xmtg tube catalog (free).

BARRY ELECTRONICS CORP.

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New York 12, N. Y. WAlker 5-7000**